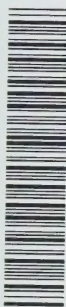


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ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: XII

DATE: Tuesday, June 7th, 1988

BEFORE:

M.I. JEFFERY, Q.C., Chairman

E. MARTEL, Member

A. KOVEN, Member

FOR HEARING UPDATES CALL (TOLL-FREE): 1-800-387-8810

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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/87) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the Ramada Prince Arthur
Hotel, 17 North Cumberland St.
Thunder Bay, Ontario, on Tuesday,
June 7th, 1988, commencing
at 9:30 a.m.

VOLUME XII

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member

A P P E A R A N C E S

MR. V. FREIDIN)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MR. B. CAMPBELL)	MINISTRY OF ENVIRONMENT
MS. J. SEABORN)	
MR. R. TUER)	ONTARIO FOREST INDUSTRY
MR. R. COSMAN)	ASSOCIATION and ONTARIO
MS. E. CRONK)	LUMBER MANUFACTURING
MR. P.R. CASSIDY)	ASSOCIATION
MR. J. WILLIAMS	ONTARIO FEDERATION OF
	ANGLERS & HUNTERS
MR. D. HUNTER	NISHNAWBE-ASKI NATION
	and WINDIGO TRIBAL
	COUNCIL
MR. J.F. CASTRILLI)	
MS. M. SWENARCHUK)	FORESTS FOR TOMORROW
MR. R. LINDGREN)	
MR. P. SANFORD)	KIMBERLY-CLARK OF CANADA
MS. L. NICHOLLS)	LIMITED and SPRUCE FALLS
MR. D. WOOD)	POWER & PAPER COMPANY
MR. D. MacDONALD	ONTARIO FEDERATION OF
	LABOUR
MR. R. COTTON	BOISE CASCADE OF CANADA
	LTD.
MR. Y. GERVAIS)	ONTARIO TRAPPERS
MR. R. BARNES)	ASSOCIATION
MR. R. EDWARDS)	NORTHERN ONTARIO TOURIST
MR. B. McKERCHER)	OUTFITTERS ASSOCIATION
MR. L. GREENSPOON)	NORTHWATCH
MS. B. LLOYD)	

APPEARANCES: (Cont'd)

MR. J. W. ERICKSON)	RED LAKE-EAR FALLS JOINT
MR. B. BABCOCK)	MUNICIPAL COMMITTEE
MR. D. SCOTT)	NORTHWESTERN ONTARIO
MR. J.S. TAYLOR)	ASSOCIATED CHAMBERS OF COMMERCE
MR. J.W. HARBELL)	GREAT LAKES FOREST
MR. S.M. MAKUCH)	PRODUCTS
MR. J. EBBS	ONTARIO PROFESSIONAL FORESTERS ASSOCIATION
MR. D. KING	VENTURE TOURISM ASSOCIATION OF ONTARIO
MR. D. COLBORNE	GRAND COUNCIL TREATY #3
MR. R. REILLY	ONTARIO METIS & ABORIGINAL ASSOCIATION
MR. H. GRAHAM	CANADIAN INSTITUTE OF FORESTRY (CENTRAL ONTARIO SECTION)
MR. G.J. KINLIN	DEPARTMENT OF JUSTICE
MR. S.J. STEPINAC	MINISTRY OF NORTHERN DEVELOPMENT & MINES
MR. M. COATES	ONTARIO FORESTRY ASSOCIATION
MR. P. ODORIZZI	BEARDMORE-LAKE NIPIGON WATCHDOG SOCIETY
MR. R.L. AXFORD	CANADIAN ASSOCIATION OF SINGLE INDUSTRY TOWNS
MR. M.O. EDWARDS	FORT FRANCES CHAMBER OF COMMERCE
MR. P.D. McCUTCHEON	GEORGE NIXON

APPEARANCES: (Cont'd)

MR. C. BRUNETTA

NORTHWESTERN ONTARIO
TOURISM ASSOCIATION

I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>KENNETH A. ARMSON</u> , Sworn	2024
Direct Examination by Mr. Freidin	2024

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
53	Witness Statement of Panel 2.	2025
54	Hard copy of slide presentation entitled: Section 5.	2061
55	Hard copy of slide presentation re: podzolic soil.	2074
56	Document entitled: The Forest Resources of Ontario 1986.	2085
57A	LANDSAT imagery of northwest corner on scale of 1 to 1,000,000 - Document 6(f).	2128
58A	LANDSAT imagery of northwest corner on scale of 1 to 500,000 - Document 6(g).	2128

1 ---Upon commencing at 9:30 a.m.

2 THE CHAIRMAN: Good morning, ladies and
3 gentlemen. Please be seated.

4 Mr. Freidin, are you ready to proceed?

5 MR. FREIDIN: Yes, sir.

6 MS. BLASTORAH: One preliminary matter.

7 We now have the balance of the tear sheets for the
8 hearing. We didn't have anything before and this is
9 the publications including the ones in the Cree
10 language that we would just like to file now.

11 THE CHAIRMAN: I see. These were part of
12 Exhibit No...?

13 MS. BLASTORAH: I believe it was No. 3B.

14 THE CHAIRMAN: Yes, Exhibit No. 3B.

15 Very well. We will admit these tear
16 sheets with respect to the various advertisements
17 placed by the Ministry in the various newspapers,
18 including the ones placed in the Cree language, and
19 admit them as part of Exhibit 3B.

20 Thank you.

21 MR. FREIDIN: I would just like to call
22 Mr. Ken Armson.

23 Mr. Chairman, will you be swearing the
24 witness?

25 THE CHAIRMAN: Yes. Mr. Armson would you

1 come forward, please.

2 KEN ARMSON, Sworn

3 DIRECT EXAMINATION BY MR. FREIDIN:

4 Q. Are you all set?

5 A. Yes, I will hook myself up, I guess,
6 to this contraption.

7 Can I be heard now?

8 THE CHAIRMAN: Yes, I believe so.

9 MR. FREIDIN: Mr. Chairman, Mr. Armson is
10 the Provincial Forester and he is going to be
11 testifying on this panel, the three panels which
12 follow, and on Panel No 9.

13 Because of that and because of his
14 position, I would like to ask the Board's permission to
15 perhaps spend a little more time on his Curriculum
16 Vitae than might otherwise have been the case.

17 THE CHAIRMAN: Very well, Mr. Freidin.
18 Go ahead.

19 MR. FREIDIN: Now, Mr. Chairman, you will
20 find an abbreviated Curriculum Vitae of Mr. Armson
21 starting on page 2 of the witness statement.

22 THE CHAIRMAN: Should we put the witness
23 statement in at this point?

24 MR. FREIDIN: I don't have an extra copy
25 or clean copy here this morning. I will provide that

1 to you this afternoon or perhaps after the next break.

2 THE CHAIRMAN: Well, all right. Why
3 don't we just give it a number at this point.

4 Exhibit No. 53 will be the witness
5 statement with respect to Panel 2.

6 ---EXHIBIT NO. 53: Witness Statement of Panel 2.

7 MR. FREIDIN: And the supplement or the
8 more lengthy Curriculum Vitae of Mr. Armson commences
9 on page 5 and runs through to page 20.

10 THE CHAIRMAN: Very well.

11 MR. FREIDIN: Q. Mr. Armson, I
12 understand that you graduated from the University of
13 Toronto in 1951 with a Bachelor of Science in Forestry
14 an Honour's Degree?

15 A. That's correct.

16 Q. And that in 1955 you obtained a
17 diploma in Forestry from Oxford University in England?

18 A. That's correct.

19 Q. And I understand that that particular
20 diploma is the equivalent of a Master's Degree in
21 Forestry in Canada?

22 A. It would be so considered.

23 THE CHAIRMAN: Excuse me, Mr. Armson,
24 could you adjust your microphone to go up a little
25 further.

1 THE WITNESS: I will tie another knot in
2 it, Mr. Chairman.

3 THE CHAIRMAN: Very well.

4 THE WITNESS: There must have been longer
5 necks in the witness stand before mine.

6 MR. FREIDIN: Maybe the witnesses feel
7 like it is being stretched during the evidence.

8 THE WITNESS: I am sure.

9 Is that better, Mr. Chairman?

10 THE CHAIRMAN: Can you hear that all
11 right? Can everybody hear Mr. Armson at the back of
12 the room?

13 (No response)

14 THE WITNESS: I will say something again.

15 MR. CASTRILLI: Yes.

16 THE CHAIRMAN: Very good, thank you.

17 MR. FREIDIN: Q. I understand that upon
18 your graduation from the University of Toronto you
19 worked for a short period of time as a research
20 forester with the then Ontario Department of Lands &
21 Forests in Maple, Ontario?

22 A. That is correct.

23 Q. And that is the predecessor of the
24 Ministry of Natural Resources?

25 A. That's correct.

1 Q. And then after a year or two in that
2 position, you became a lecturer at the University of
3 Toronto in the School of Forestry?

4 A. I did.

5 Q. And I understand that you were on the
6 staff of that particular faculty for the years 1952 to
7 1978?

8 A. That's right.

9 Q. And that you went through the normal
10 progression of lecturer to assistant professor of
11 forestry and achieved the position of full professor
12 and lecturer with that faculty in 1968?

13 A. That's correct.

14 Q. And so you held that position for ten
15 years?

16 A. Yes.

17 Q. I understand, sir, that your C.V.
18 indicates in the first paragraph that your teaching
19 responsibilities involved working primarily in the
20 areas of silviculture and forest soils; is that
21 correct?

22 A. That is correct.

23 Q. Could you explain what silviculture
24 is and what the courses in relation to forest soils
25 dealt with?

1 A. Silviculture is that part of forestry
2 that deals with the harvesting, the regeneration and
3 the maintenance, as we would call it, tending of the
4 forest for the purposes of producing timber and, in
5 general, timber management.

6 The course in forest soils and the
7 subject of forest soils is an area of knowledge and
8 application dealing with the knowledge of soils in
9 forest conditions, and also the manipulation and
10 treatment of soils in specific sets of conditions as
11 for regeneration only in a very intense sense, in
12 nurseries where we grow seedlings for soils and that is
13 where I did a good bit of work.

14 Q. I understand, sir, that you were the
15 Assistant Dean of the faculty for a short period of
16 time, 1976 to '77?

17 A. That's correct.

18 Q. I understand that in 1976 you were
19 approached by the Ministry of Natural Resources and
20 requested to carry out an evaluation of the forest
21 management activities of that Ministry at that time?

22 A. No, a correction. I was invited in
23 1975 and completed the study during the period 1975 and
24 '76. June is when the report was finally completed.

25 Q. And that particular document is

1 Document No. 18 to this witness statement and perhaps,
2 Mr. Armson, you could just give a very brief outline as
3 to what was involved in that particular task?

4 A. I was invited to look at all aspects
5 of what were then termed the forest management activity
6 in the province, both on Crown lands and on private
7 lands, private forest lands, to look at all aspects,
8 not only in terms of the practices, the processes that
9 were involved and, particularly, the position of
10 foresters and technicians in that forest management
11 activity.

12 Q. Okay.

13 A. Basically it was a very broad terms
14 of reference.

15 Q. I understand there were a number of
16 recommendations made in that particular report which is
17 Document No. 18, and the recommendations included a
18 recommendation which actually was implemented and was
19 the basis of the forest management agreements that we
20 have heard about in Panel No. 1?

21 A. That is correct. In fact, in my
22 report I focused very particularly on the matter of
23 harvesting and regeneration which, at that time, the
24 responsibilities were divided between industry on one
25 hand and the Ministry on the other. So I spent a great

1 deal of time on that.

2 Q. All right. I understand that your
3 evidence will deal a little bit more about your
4 concerns about that particular matter of harvesting and
5 regeneration being separate?

6 A. It will.

7 Q. I understand in 1978 you joined the
8 Ministry of Natural Resources?

9 A. Yes. I was invited by the then
10 Minister, Deputy Minister, to take part in negotiations
11 with the industry in January of 1978, and I did -
12 originally I was on a leave of absence from the
13 university, but it became clear that the negotiations
14 and the subsequent aspects of implementation would take
15 much longer than eight months, so I joined the Ministry
16 staff at that time.

17 Q. And in addition to negotiating a
18 number of agreements, were you involved in the
19 preparation of any particular documents which related
20 to that program?

21 A. Yes, I took part in preparation of
22 three basic documents. Following the negotiations, a
23 draft agreement was prepared and I was very much
24 involved in the preparation of that document.

25 Q. And this is the draft agreement

1 between who?

2 A. Between the Minister on one hand and
3 an agreement holder on the other. At that time, we
4 also were involved in preparing amendments to the Crown
5 Timber Act and I was involved in assisting in the
6 drafting of what is now Section 6 of the Crown Timber
7 Act which was introduced in 19 -- into the Legislature
8 in 1979.

9 And, further, I was involved in the
10 preparation and was the co-author of a manual, forest
11 management manual, which was like the document that
12 gave guidance to the agreement holders and the Ministry
13 during implementation and on-going activities of the
14 forest management agreement.

15 Q. And the Section 6 of the Crown Timber
16 Act that you refer to was the section which deals with
17 forest management agreements?

18 A. That is correct.

19 Q. The manual that you were involved
20 with or had some responsibility in preparing -- in
21 Panel No. 1 there was evidence about the consolidation
22 of a number of manuals in around 1985, 1986.

23 Was this manual that you were involved in
24 drafting back in the early 80s one of the documents or
25 one of the plans which was consolidated.

1 A. It was one of the manuals that was
2 consolidated into the Timber Management Planning
3 Manual.

4 Q. And the present Timber Management
5 Planning Manual then applies to forest management
6 agreement units as well as Crown and company units?

7 A. That's correct.

8 Q. Prior to the manual that was prepared
9 for forest management agreement holders, was there any
10 provision for public consultation or public involvement
11 in the preparation of plans?

12 A. No, there was not and that was one of
13 the points that we recognized even during the
14 negotiations, that in the preparation of a forest
15 management plan under the forest management agreement
16 there would have to be an opportunity - and that was
17 specified very clearly in the manual which guided the
18 activities of the agreement holder.

19 That was in 19 -- the first application
20 would be in 1980 because the first agreement was signed
21 in April of 1980.

22 Q. Perhaps I could just digress for a
23 moment and deal with a matter which was raised in Panel
24 No. 1 or during the evidence.

25 Prior to an agreement being entered into

1 between the forest management agreement holder and the
2 Minister of Natural Resources, is there any provision
3 for public involvement?

4 A. There is a provision for notification
5 and an invitation to participate in the setting up of a
6 candidate forest management agreement area.

7 If I might just expand a little for the
8 Board's benefit here. The decision was that the
9 candidate forest management agreement areas would
10 essentially comprise existing licenced areas -- company
11 licensed areas which was where a particular company
12 would be, if you like, a candidate for the agreement.
13 Or, in the case of Crown units, it would be those of
14 those Crown units, there were a small number of Crown
15 units that became FMAs.

16 And at that time we recognized that there
17 were areas that might exist within these licences
18 which, because the licences perhaps were of some
19 longstanding duration, there were areas that were
20 recognized either by the Ministry or by other persons
21 or groups that should be excluded.

22 For example, candidate waterway parks and
23 candidate parks generally, and at that time, in the
24 late 1970s, there was a great deal of interest and in
25 fact there were a number of candidate parks that were

1 being considered.

2 Other areas, specific areas of their
3 particular interest or value of concern, this was the
4 opportunity then for individual or groups to make that
5 known to the Ministry. So this was before the actual
6 setting in place of an agreement.

7 Q. Is that procedure in place at the
8 present time?

9 A. That is in place and applies to all
10 potential or candidate forest management agreement
11 areas.

12 Q. Thank you. I understand that for the
13 periods 1980 to 1983 - and this was on completion of
14 your responsibilities in relation to the forest
15 management agreement negotiations - that you accepted
16 the post of Chief Forester with the forest resources
17 group with the Ministry?

18 A. That is correct.

19 Q. And could you briefly outline what
20 your responsibilities would have been in that position?

21 A. The major area of responsibilities
22 were with the practice, with the level of professional
23 activity in the field, but actually more specifically
24 there was a great deal of concern about the status of
25 private land forests and for two of those years I, and

1 members of the staff of the forest resources, were
2 engaged in the preparation of a rather voluminous
3 background document called -- which was eventually
4 published by the Ministry as a green paper.

5 This was a document called Private Lands,
6 Public Resource -- Private Forest Lands Public
7 Resource.

8 Q. Mr. Armson, you indicated that the
9 position involved dealing with professional and
10 foresters in the field?

11 A. Yes.

12 Q. Perhaps you could expand on what your
13 responsibilities in that regard were?

14 A. One of my responsibilities, I spent a
15 great deal of time as Chief Forester in field
16 visitations with field forestry staff and in fact was
17 very much involved in bringing - not so much to their
18 attention - but making them aware of information.

19 I became involved in the forester in
20 training program, not directly in terms of its
21 administration, but in developing what became a revised
22 version of the forester in training program.

23 Q. And I understand the Ministry does,
24 at the present time, have a forestry in training
25 program?

1 A. We do and it is based on the revised
2 version.

3 Q. I understand, sir, that you were
4 involved in the formation of the Ontario Forestry
5 Council ?

6 A. Yes, I was.

7 Q. And what is the Ontario Forestry
8 Council?

9 A. The Ontario Forestry Council came
10 into being as a result of concerns expressed by the
11 Ministry, more particularly the Deputy Minister of the
12 day, in the year 1983 about the status of research, not
13 only forest research, but forest research within the
14 Ministry.

15 As a result of a series of meetings and
16 reviews that were held by the then science advisor to
17 the Minister Deputy Minister, Dr. Walmesly, a major
18 meeting was held in November of 1983 at which there was
19 a wide-ranging representation from all groups -- public
20 groups, particularly those who had a special interest
21 in, for example, the fisheries, the wildlife, the
22 Federations of Ontario Naturalists was represented, I
23 believe, and the research organizations, both
24 provincially and nationally as well as universities.

25 And at that time I guess the main

1 conclusion of the meeting was that there was no
2 effective mechanism for the setting of research
3 priorities or directions -- although there were
4 priorities and directions set, it didn't involve an
5 input from the major -- often the major user or client
6 groups.

7 As a result of that, the Deputy Minister
8 and I became involved in setting up a series of meetings
9 which was hosted by the Minister of the day and to
10 which were invited the senior executives from the
11 forest industry with a view to taking one aspect of
12 setting priorities and dealing with that in relation to
13 the forest products industry and the division of
14 timber.

15 It was from those meetings that the
16 Ontario Forestry Council was formed in 1984 and the
17 Council then became responsible for really becoming the
18 single body or committee of that council, the Ontario
19 Forest Research Committee is now a committee in which
20 there is representations from the universities, from
21 the industry, from both the management field management
22 side and from the senior executive side, from the
23 government agencies, both federal and provincial who
24 have forest research facility, that is now an on-going
25 process for setting directions of priorities for forest

1 research.

2 Q. And when this committee makes
3 decisions about priorities or direction, what do they
4 do -- what do they do with that information?

5 A. That information, that is distilled
6 up by the committee and the Deputy Minister of the
7 Ministry of Natural Resources and the Associate Deputy
8 Minister of the Canadian Forestry Service both sit on
9 the council and, therefore, are aware of the directions
10 and the priorities.

11 Q. And the Ontario Forestry Council
12 deals with the review and current research and
13 developments in Ontario?

14 A. That is correct, only in Ontario.

15 Q. And is there a federal equivalent to
16 this group?

17 A. Not quite an equivalent, but there is
18 a Forest Research Advisory Council to the Associate
19 Deputy Minister of the Canadian Forestry Service and
20 that has representation from the provinces and from the
21 industry across the country and from the universities.
22 I sit on that body representing Ontario.

23 Q. All right. Are you a member, or have
24 you been a member of the Ontario Forestry Council or
25 the Forest Research Committee of that council?

1 A. I am a member of the Ontario Forest
2 Council and do not -- I am not a member of the Ontario
3 Forestry Research Committee. I often am invited to
4 attend meetings, but I am not a member of that
5 committee.

6 Q. Now, Mr. Armson, in 1983 you became
7 the Executive Co-ordinator of the forest resources
8 group in the Ministry; is that correct?

9 A. That is correct.

10 Q. And that made you the senior person
11 responsible for the forest program within the Ministry?

12 A. That is correct.

13 Q. And you held that position, I
14 understand, until 1987?

15 A. 1986.

16 Q. 1986. I understand the next position
17 you held after Executive Co-ordinator was your present
18 position as the Provincial Forester?

19 A. Yes.

20 Q. And that appointment was effected on
21 what date?

22 A. On November the 1st, 1986.

23 MR. FREIDIN: That will require a
24 correction, Mr. Chairman, to the Curriculum Vitae on
25 page 7 in the first paragraph. .

1 Q. Before I ask you to describe your
2 responsibilities as the Provincial Forester, Mr.
3 Armson, I understand that in terms of research you were
4 involved in the development of technical development
5 units?

6 A. Yes, I was.

7 Q. Could you explain what those units
8 are and what your function is?

9 A. If I might explain that. In most
10 areas of endeavor where you have research on one hand
11 and practice on the other, the application of
12 research - whether it be it medicine, but I think more
13 particularly an analogy might be with agriculture -
14 there has in these mature areas developed a third area
15 which, in effect, bridges between research on one hand
16 and the results of scientific endeavor and the
17 application of those results on the other hand in
18 practice. And this is, in fact, a very large area in
19 agriculture in terms of agricultural extension.

20 For the most part, in Canada, although
21 not necessarily in other jurisdictions, there has been
22 very little of that bridging, in fact, the bridging is
23 often left to be the responsibility of the scientist or
24 the manager.

25 Scientists, their key responsibility is

1 to undertake science. They, therefore, in many
2 instances are not adept nor well trained in the process
3 of taking information and making it understandable and
4 available -- readily available or applicable to those
5 who can use it. They deal in fact with their own
6 theories.

7 Managers are busy managing. They have,
8 for the most part, relatively little time to read
9 scientific journals and, when they do, they often find
10 them difficult to comprehend. And, as I say, there is
11 a great need in most areas, and particularly in
12 forestry, for this bridging mechanism.

13 And, in Ontario, we looked at this and
14 this was essentially in the early 1980s and had some
15 sense of how this might develop, because in the 1970s,
16 because of the energy crisis, there had been a great
17 deal of interest shown in the production and growth of
18 fast-growing trees such as hybrid poplars.

19 The Ministry in its research had in fact
20 over a number of years, in fact several decades,
21 created a population of hybrid poplars that had
22 extremely fast growth; they were not being used in
23 practice, in fact, there had not been broad field
24 trials.

25 In relation primarily to the energy

1 crisis, it was decided that -- also to the fact in
2 relation to the fact that a mill of Domtar at Cornwall
3 was drawing wood from, not only its own lands in New
4 York State, but a significant amount of wood for the
5 mill was coming from Quebec, and there was some
6 rationale that if fast-growing wood, hardwoods could be
7 provided within the vicinity of that mill within
8 something of the order of a 25 or 50-mile radius, it
9 could not only supply the mill, but it would give us an
10 opportunity to develop cultural techniques,
11 silvicultural techniques which would enable us to grow
12 hybrid popular.

13 So in the early 70s a small unit was
14 established there with three foresters in charge to, in
15 fact, carry out what we would now call technology
16 development of the science and the knowledge concerning
17 hybrid poplars and take that and put that into a field
18 application.

19 And one of the key ways of doing that was
20 to set out a series of trials: How do you prepare the
21 soil to plant hybrid popular, what kind of treatments,
22 what kind of spacing, and it was really from that
23 experience that we gained knowledge about the
24 importance of technology development units.

25 And, in fact, from that the second unit

1 was developed in Timmins in northern Ontario and the
2 person who had been heading up that unit at Brockville
3 in the eastern region was the person who started the
4 new technology development unit in Timmins.

5 Q. I understand that at the present time
6 there are four technology development units?

7 A. That is correct. There is another
8 one that has been established within the last year and
9 and a half here in Thunder Bay to serve both our
10 northwestern and northcentral regions and a fourth one
11 which is being established in North Bay, more recently,
12 and that unit and the unit here -- the unit here has a
13 wildlife biologist on staff.

14 We recognize that in technology
15 development that in particular other disciplines,
16 particularly wildlife biology, is necessary.

17 Q. I may have improperly referred to
18 these units as technical development units. The proper
19 term is technology development units; is that correct?

20 A. That is correct, yes.

21 Q. Now, could you describe for the Board
22 your responsibilities as the Provincial Forester which
23 is the position you indicated you have held since late
24 1986?

25 A. I am concerned with both levels --

1 forestry practice and policies at a broad level.

2 I report directly to the Deputy Minister
3 and, in terms of policy, I am involved as a member of
4 the Ministry's Policy Committee not only with the
5 policies relating to forest resource, but also policies
6 in general with the Ministry.

7 In particular, I am also responsible for
8 the liaison, if you will, between this province in
9 terms of general matters of forestry importance - I
10 have mentioned my position as a member of the Forest
11 Research Advisory Council federally, so I have a
12 linkage there and am responsible for maintaining
13 contact with other provinces in terms of both their
14 policy and their forest research.

15 I have also responsibilities dealing
16 with, internally within government, for example, in the
17 period 1986 and into early '87, during the issue of the
18 softwood lumber countervail, I was the - apart from the
19 Deputy Minister - I was the key representative on those
20 groups with other provinces and with the Federal
21 Government.

22 If I also might -- I have involvement
23 with the Ontario Tree Improvement Council which is a
24 joint council between the Ministry and participating
25 companies and I am a member, an ex officio member of

1 that Council.

2 Q. I understand that in terms of the
3 policy committee of the Ministry that that particular
4 body deals with policies relevant to the Ministry in
5 all of the programs that the Ministry has
6 responsibility for, it is not limited specifically to
7 forestry?

8 A. That's correct.

9 Q. We have heard a bit of evidence, a
10 lot of questions about the Baskerville Report entitled:
11 The Audit of Management of the Crown Forests of
12 Ontario, which was carried out by Dean Gordon
13 Baskerville of the University of New Brunswick.

14 I understand that after that report that
15 was released that you, as the Provincial Forester, were
16 assigned certain responsibilities in relation to it?

17 A. Yes. The first responsibility was
18 the day after the report was released, I chaired a
19 meeting at which Dean Baskerville and some 70 members
20 of the Ministry staff, mainly foresters, unit
21 foresters, but also including the Assistant Deputy
22 Minister for northern Ontario, met and discussed his
23 report in some considerable detail.

24 And then, subsequent to that, the
25 Ministry prepared an action plan and I was given the

1 responsibility of presenting reports and ensuring that.
2 the various actions, there were some 16 actions, 15
3 that were to be initiated after the 1st of November,
4 and I was given the responsibility to ensure those
5 actions were undertaken.

6 Q. And I understand later in your
7 evidence you will be dealing with those matters by way
8 of providing an update of the present status of those
9 actions?

10 A. Yes.

11 MR. FREIDIN: And just for the record,
12 Mr. Chairman, that particular -- the summary of those
13 16 actions is found in the Environmental Assessment
14 Document in Appendix No. 7, Roman numeral VII.

15 Q. Mr. Armson, I understand that from
16 approximately 1956 to 1977 you have been involved in
17 consulting work for various governments and various
18 companies within the private sector in relation to
19 forestry matters?

20 A. Yes, I was.

21 Q. And that from '56 to 1977 you did a
22 number of studies for the Ministry of Natural
23 Resources, and from 1965 to 1977 you had a significant
24 involvement as a consultant with J.D. Irving Limited, a
25 company involved in forestry?

1 A. Yes, that is correct.

2 Q. Could you advise the general areas of
3 the consulting work that you did for the Ministry of
4 Natural Resources from 1956 to 1977?

5 A. Yes, I could. In the -- following my
6 return from graduate work in England, I was asked by
7 the then head of the division of reforestation to
8 review nursery practices in the province.

9 At that time, there were -- the nurseries
10 were essentially in southern Ontario, they were then
11 beginning to establish new nurseries in Northern
12 Ontario, although there was one here in Thunder Bay,
13 and there was concern about the cultural practices,
14 particularly the soil management practices.

15 And just as a little background, if I may
16 for the Board, at that time Great Britain, via both the
17 Forestry Commission and the private landowners, large
18 estate owners, was engaged in one of the largest
19 reforestation or they would use reforestation programs
20 probably that had ever been undertaken anywhere.

21 To give you some idea of the magnitude;
22 the Forestry Commission in the mid 50s was producing
23 over 250-million trees a year for out-planting - this
24 is in great Britain - and the private sector was
25 producing approximately a similar number, 250-million.

1 In Ontario, we produce 150-million for this province.

2 As a result, they had run into
3 considerable troubles in developing stock; that is, the
4 intensity of the approach, and during my graduate
5 studies I had been involved in inspecting their
6 nurseries and part of my studies related to nursery
7 culture and technique.

8 , So when I came back, I was invited to
9 look at the nurseries here. And from 1956 on, I think
10 to 1977, I was annually involved in one aspect or
11 another.

12 In the late 1950s, in particular, I set
13 up a laboratory for the routine analysis of nursery
14 soils and nursery stock and that has continued to this
15 day as a monitoring system for both the stock quality
16 and also the cultural techniques related to it. I was
17 involved in preparing a manual on the subject, and that
18 has been documented.

19 The area that I then became involved in
20 with the Ministry, in the early 60s, was in plantation
21 establishment and in some certain aspects of growth of
22 plantation trees and did a considerable amount of study
23 of that, particularly area in root development in
24 relation to above-ground growth. So that was primarily
25 my involvement with the Ministry.

1 With the Irving company --

2 Q. Just before you deal with that. When
3 you use the phrase "plantation establishment", that you
4 did work in that area.

5 A. Yes.

6 Q. What sorts of matters would you have
7 to be considering in your dealing with it?

8 A. The key areas there were the nature
9 of initial development, what were the factors in terms
10 of site preparation, for example, that were controlled
11 at early development and what were the relationships
12 between certain soil factors and so on, and early
13 growth of the young plantation.

14 Q. Okay.

15 A. With the J.D. Irving Company, I was
16 invited to go down there in 1965 because they were
17 having problems growing nursery stock. I guess they
18 were aware of the fact I had been working on similar
19 problems here in Ontario.

20 As a result of my initial visit there in
21 '65, and then subsequently invited back in '66, I
22 became involved in a rather major development in
23 nursery stock production and, in fact, in 1970 with the
24 first major private establishment of container stock
25 production in Canada.

1 I also there, as with the Ministry, had
2 been very much involved in the factors affecting early
3 survival and growth and there, particularly, the
4 silvicultural treatments of tending that ensured high
5 survival in subsequent growth.

6 Q. I understand that during that period
7 then, up to 1977, in addition to consulting for the
8 Ministry of Natural Resources in Ontario and the Irving
9 Company, that you did consulting for the British
10 Columbia Forest Service in 1974, for the Province of
11 Nova Scotia in 1977, for Spruce Falls Power and Paper
12 Company Limited in 1961, and also did some consulting
13 for a two-year period for Abitibi-Price?

14 A. That is correct.

15 Q. And I understand that your consulting
16 in relation to Abitibi-Price related primarily to
17 forest renewal practices?

18 A. That is correct.

19 Q. And required you to examine those
20 practices in relation to, not only Ontario, but
21 Manitoba and Newfoundland?

22 A. That is correct.

23 Q. And was the consulting that you did
24 for the other governments, Nova Scotia and British
25 Columbia, of a similar nature?

1 A. Yes, it was related. The one in 1974
2 with the Government of British Columbia, they had a
3 considerable amount of experimental planting of those
4 types of nursery stock, particularly container stock,
5 throughout the province and they invited me to make an
6 assessment of the results of those studies and make
7 recommendations to them.

8 With the Province of Nova Scotia, it was
9 in relation to the establishment of a nursery for the
10 production of stock in northern Nova Scotia.

11 Q. On page 4, Mr. Armson, of the witness
12 statement, in dealing with other professional
13 experience, it indicates that during your career you
14 visited and studied forestry practices in a number of
15 countries which are listed: Scandinavia, the United
16 Kingdom, France, southeastern, northeastern,
17 southwestern and northwestern forest regions of the
18 United States, in addition to the provinces we have
19 already referred to.

20 What, in a general way, was involved in
21 terms of the visitations and perhaps the study of the
22 forestry practices in those areas?

23 A. Well, the ones in Scandinavia and
24 Europe were primarily related to nursery practices
25 beginning in 1955 and subsequently in 1970 and--

1 Q. They liked your evidence so far.

2 A. --in 1970, and then in 1976 I was
3 back in those areas looking primarily at not only
4 nursery practice, but general management and
5 silvicultural practices.

6 In the northeastern United States, I have
7 had periodic visits to the States of Washington and
8 Oregon since 1963.

9 And in 1974, I did a rather extensive
10 tour there on behalf of the British Columbia government
11 to look at, for example, the container production of
12 seedlings by private companies in relation to that
13 particular subject.

14 In the southeastern United States, I have,
15 because of my professional and academic interest and,
16 as a member of american professional societies,
17 particularly the Soil Science Society of American -
18 they have a section dealing with forest and rain soils
19 and I became the Chairman and Director of that
20 section - I had an on-going, very close connection with
21 my colleagues in the universities of forestry schools
22 and, more particularly, schools such as North Carolina
23 State University, Oregon State University and State
24 University of New York.

25 And I was involved, for example, in

1 taking groups of students down to North Carolina, and
2 since my coming with the Ministry, we took a group of
3 some 30 foresters from here in 1980 down to Georgia to
4 look at practices in that area.

5 Q. And would you indicate the areas you
6 dealt with in the United Kingdom and France?

7 A. In France it was rather more of a
8 general look at some of the areas, but more
9 particularly in 73/74, I spent two weeks in the area of
10 southwestern France where there is a major production
11 of pines for the saw log and pulp and paper industry
12 and there is a major reforestation in an area south of
13 Bordeaux, an area called Gironde District.

14 And I was involved in there,
15 particularly, as part of an international union of
16 forest research organizations and meetings.

17 THE CHAIRMAN: I was there last September
18 but I spent more time, I think, touring some of the
19 wineries than I did the forests.

20 THE WITNESS: We also visited, if I may,
21 Mr. Chairman, le Cage de Ste. Vermillion. So I think
22 we...

23 MR. FREIDIN: Q. I understand, Mr.
24 Armson, that your Curriculum Vitae on pages 9 and 10
25 set out the organizations or associations that you are

1 a member of, and perhaps I could just review those and
2 you can indicate whether you are presently a member of
3 these groups.

4 The Ontario Professional Foresters
5 Association?

6 A. Yes.

7 Q. The Canadian Institute of Forestry?

8 A. Yes.

9 Q. The Society of American Foresters?

10 A. Yes.

11 Q. The Soil Science Society of America?

12 A. Yes.

13 Q. The Ontario Forestry Association?

14 A. Yes.

15 Q. That you are presently the Director
16 of the Canadian Forestry Association?

17 A. Yes.

18 Q. That you have held positions on the
19 executives of all of the organizations that I referred
20 to?

21 A. That's correct.

22 Q. And the positions you held are in
23 fact set out in your Curriculum Vitae?

24 A. That is correct.

25 MR. MARTEL: What do you do in your spare

1 time?

2 THE WITNESS: I don't think I will answer
3 that, Mr. Martel, on the grounds that it might
4 incriminate me.

5 MR. FREIDIN: Q. I understand, Mr.
6 Armson, that in 1978 you were the recipient of the
7 Canadian Forestry Achievement Award and gold medal
8 which is given by the Canadian Institute of Forestry;
9 is that correct?

10 A. That's correct.

11 Q. And I understand that that particular
12 award is given to those that the Canadian Institute
13 believe have made an outstanding contribution to
14 forestry or in recognition of their work, generally in
15 the area of forestry?

16 A. Yes.

17 Q. And one other person who has received
18 that award, his name has come up in this particular
19 hearing already, is Dean Baskerville?

20 A. That's right. If I may, another
21 member of the Ministry staff has also received that
22 award, a Mr. Victor Zabinsky who is the head of the
23 Ontario Centre for Remote Sensing.

24 Q. Mr. Armson, there is an extensive
25 list of your publications which runs from page 15 --

1 pardon me, 13 to page 20.

2 THE CHAIRMAN: You are not going to
3 review these one-by-one I hope?

4 MR. FREIDIN: I am not.

5 Q. Would I be correct in generalizing,
6 that from 1950 to the mid-, 1970s the publications or
7 the papers that you authored dealt primarily with
8 scientific and the technical aspects of forestry?

9 A. Yes, that would be correct.

10 Q. And that since 1976, that the
11 documents are perhaps dealing with broader principles
12 of forest management including forestry policy?

13 A. Yes, that is correct.

14 Q. I did a count, there are 33
15 publications which you indicate on page 13 are
16 refereed, perhaps you can just explain what that means?

17 A. These are papers that are submitted
18 to professional or scientific journalists where the
19 papers are read and reviewed and criticized by peers,
20 other scientists, and subjected, as we say, to peer
21 review and, at that time, they may be accepted,
22 accepted with some changes, or may be rejected.

23 It is a conventional way for scientists,
24 and I think people may in other professions, for
25 ensuring that the quality of the work that is published

1 is of a certain caliber.

2 Q. I understand that you are the author
3 of two standard university texts which are used in
4 forestry?

5 A. Yes.

6 Q. Can you just advise what those texts
7 are, what they deal with?

8 A. The one in particular is the textbook
9 on forest soils which was published in 1977 which has
10 been very generally used, not only in schools here, but
11 also in schools in the United States and elsewhere.

12 The other text, if you will, is actually
13 a major publication of the Ministry which is the
14 nursery soil management techniques which has become a
15 standard in standard use.

16 Q. And could I just ask you, in dealing
17 with soils, would that work involve the examination of
18 the effects of factors such as fire, and other agents
19 of change on the productivity of the soil?

20 A. Yes, particularly the effects of fire
21 and, in fact, in 1968 I was engaged in a major study
22 for the then Department of Lands & Forests of the
23 effects of fire in northwestern Ontario on the soil and
24 more particularly its impact in terms of soil erosion.

25 Q. And would that area of expertise also

1 involve you in determining the effects on soil of, sort
2 of, man-caused activity or changes?

3 A. Well, the use of prescribed fire or
4 the application of the principles to other kinds of
5 activities as we might have in silvicultural, yes.

6 MR. FREIDIN: Mr. Chairman, I would ask
7 that Mr. Armson be qualified as an expert in forestry,
8 silviculture and silvics.

9 Q. And I didn't ask you what silvics
10 were, Mr. Armson, so perhaps you better explain that
11 before I ask?

12 A. Silvics is often referred to as the
13 basis for silviculture. It is the body of knowledge
14 that deals with the biological characteristics of the
15 species: black spruce, jack pine, and so on; the
16 regeneration, the flowering, the manner of growth, and
17 also the response of that species to external factors:
18 the climate, if you like temperature, and soil
19 conditions, and this is the interplay between the
20 organism and its environment. That area is the body of
21 knowledge we refer to as silvics.

22 THE CHAIRMAN: Mr. Armson, the Board will
23 accept your qualifications in those categories.

24 MR. FREIDIN: All right. I would also
25 like Mr. Armson to be qualified as an expert in forest

1 soils and forest history and policy.

2 THE CHAIRMAN: Any comment from anybody
3 on those qualifications?

4 (No response)

5 So qualified. Thank you.

6 MR. FREIDIN: Q. Mr. Armson, could you
7 provide the Board with an outline or an indication of
8 the areas or the subject matters that you are going to
9 be dealing with during your evidence?

10 A. Yes. I would like to talk about
11 essentially four areas, and the first one, which I
12 think is perhaps the most obvious one, deals with the
13 forests of the province and we use a term in relation
14 to that --

15 MR. MARTEL: Pardon me, I didn't hear
16 that.

17 MR. ARMSON: Oh, the first one of the
18 four elements that I would like to briefly describe are
19 the forests of the province.

20 And we sometimes, if I may, Mr. Chairman,
21 the jargon, we talk about the forest estate and that
22 really is a term that we use in relation to any area of
23 forest no matter what the ownership.

24 So if I refer to the forest estate, I am
25 referring to merely the area of forest, independent of

1 the ownership, although here obviously we are talking
2 primarily, almost exclusively, of Crown land forest.

3 The second area would be, not only the
4 forest, but the factors that affect that forest. And
5 the third then would be the historical development,
6 particularly since the late 18th Century in terms of,
7 if you like, the movement of society into that,
8 particularly the European society into it, but I would
9 like to just move forward through the historical
10 development and, more particularly, point out some of
11 the relationships that that development has had and
12 some of the impacts that that has had as it now affects
13 our current situation.

14 Finally, I would like to deal with some of
15 the concepts that have are embodied in looking at that
16 historical development and, again, bring out some of
17 the key features there that I believe are relevant to
18 our concern today.

19 With the Board's permission, what I would
20 like to do is: I have an overhead which summarizes the
21 items on Paragraph 5 of the document, that is on page
22 24 of the document -- I am sorry, 22 of the document.

23 There are nine points there listed under
24 that Paragraph 5, the nine points (a) to (i), and what
25 I have done, just to sort of focus attention, is

1 prepared an overhead and I will put it up here and I
2 will speak very briefly to these points.

3 And then I would like to come back to the
4 sequence of the forest, the development, historical
5 development and then lead into the condition and state
6 that we are now in terms of timber management, with
7 your permission.

8 THE CHAIRMAN: Is the overhead available
9 in hard copy?

10 MR. FREIDIN: I have it here. Perhaps I
11 could...

12 THE CHAIRMAN: Exhibit 54.

13 --EXHIBIT NO. 54: Hard copy of slide presentation
14 entitled: Section 5.

15 THE WITNESS: Is that visible to the
16 Board from where you sit or...

17 THE CHAIRMAN: It is from here.

18 Can everybody see this overhead?

19 (No response)

20 THE WITNESS: What I would then like to
21 do is move through each of these nine elements and
22 briefly describe what they relate to.

23 So for -- the first concept here is that
24 forest industry development, whatever nature it is,
25 responds to demands in the marketplace; that is what

1 triggers it off, if you will. If the marketplace for
2 one product is down, then either the industry goes down
3 or it moves to the production of the product.

4 In terms of the forest industry, that
5 change in market demand also means that there will
6 inevitably be, because of the nature of the forest
7 which is a natural forest, that there will be changes
8 required in access to timber. So as the marketplace
9 changes, then there will be often needs to change the
10 kind of species that are used and maybe even the
11 quality.

12 The second point, and this is -- I think
13 we have heard considerable discussion on this, is that
14 particularly where we are dealing with public lands,
15 there is more than one user; therefore, there is a need
16 to have some form of mechanism or mechanisms which deal
17 with the differing of the conflicts that may arise
18 between different users.

19 The third point, related to the first one,
20 is that the timberlands we are talking about are a
21 public resource; therefore, the public at large is the
22 owner and they are represented in our process, if you
23 like, by the government and the government, if you
24 like, then controls and issues -- has a mandate to the
25 Minister - in this case, the Minister of Natural

1 Resources - for the responsibility of managing and
2 dealing with that resource.

3 I would like to just make this point
4 because I think often it is lost when we are dealing
5 with some of the members of public, we forget that
6 there are other owners out there besides just
7 themselves and there is a process for dealing with that
8 ownership.

9 The fourth point, one that sometimes is
10 overlooked, is that timber management requires
11 professional knowledge and expertise, and as I will be
12 drawing out and drawing to the Board's attention, that
13 has not been a constant throughout the development and
14 exploitation of our forest where, indeed, what we often
15 have referred to generally as "managemen".

16 If we are to manage a forest, for whatever
17 purposes, it requires a definition of the land base and
18 once that land base is defined, then the data base, the
19 knowledge that is related to it, the inventory of what
20 we are dealing with - as we say the forests
21 themselves - can then be done on some kind of a defined
22 base.

23 If it is just a general base, we have
24 difficulty in dealing with that. And it is
25 particularly necessary to deal with a defined base for

1 management planning.

2 The sixth point, and one that again is
3 perhaps overlooked, that the time frame with which we
4 are dealing, particularly in terms of managing the
5 forest, the setting of objectives, the development of
6 the plans and so on, has to take into account the time
7 frame over which the trees and the forests grow, and
8 also the influences that will likely impact that forest
9 and the trees over that period of time.

10 So that we are looking at essentially, in
11 our conditions, relatively long-term; we are looking at
12 decades, maybe in some cases as short as four or five
13 decades, but we are looking at decades and we are,
14 therefore, looking at probabilities as to likelihood of
15 actions taking place in the future, but we are also
16 looking at the need for long-term strategies and we are
17 looking, therefore, also at commitments towards
18 achieving those, the implementation of those
19 strategies.

20 In the early days of accessing part of our
21 forest, there was no doubt that in the views of the
22 people accessing it was almost an infinite resource.
23 One has to read some of the early documents to see that
24 it was a forest that was endless. Indeed today, if you
25 look at some of the areas, one has that general

1 impression.

2 If we do not recognize that it is a
3 finite resource; no matter how large that resource may
4 be, it is still finite, and if we are going to ensure
5 continuity of wood supply then we have to take that
6 into consideration and deal with that.

7 That has some considerable bearing on the
8 previous point here, the time it takes for trees and
9 forests to grow and mature and it also relates back to
10 the probabilities of factors that will impact on that
11 growth and development or death of the forest, and I
12 will be dealing with that at some length.

13 The next point that I would like to deal
14 with is that we have reached a stage in resource
15 planning where a relatively high degree of
16 sophistication is required; for that we have to have
17 information and we have to have the capability to
18 analyse it and, therefore, use it.

19 But I would point out that we are dealing
20 with a very large extensive area and, in determining
21 the information, we have to relate it back to the
22 purposes for which we are managing and the areas for
23 which we are managing.

24 And finally the point that I again will
25 be emphasizing is that forests are not static, the

1 trees that we see today, we may see tomorrow, in fact
2 we may see for the next few years, but they are not
3 static; they are growing even while we are looking at
4 them and that often in many peoples' minds they look at
5 a condition of forest that registers as, if you like, a
6 snapshot and they carry away that snapshot with them as
7 a state of that particular condition or forest.

8 The next year or the next year, if they
9 don't come back, of course, they don't see the change
10 and they keep that image of that. And what we have to
11 recognize is that what we see now is not what we are
12 going to see if we return to the same area the next
13 year, the next five years, the next ten years or twenty
14 years, and this is often lost sight of.

15 And I think, if I may, Mr. Chairman, that
16 is sort of an overview of the nine points and I would
17 like to just take off the overhead at this stage.

18 THE CHAIRMAN: Very well.

19 MR. FREIDIN: Q. I understand, Mr.
20 Armson, that your review of the history of timber
21 management will, in fact, demonstrate how those various
22 concepts that you have just outlined were in fact
23 developed over time?

24 A. That's correct, and...

25 Q. And I also understand that some of

1 those particular concepts or topics related to them
2 will be the subject matter of more detailed evidence by
3 many of the panels which follow?

4 A. That is correct, yes.

5 Q. And we will try to point that out
6 perhaps somewhere as we go along.

7 A. Right. I thought again, Mr.
8 Chairman, if I might, there are a series of documents
9 that are embodied in Panel 2 evidence, and what I have
10 done is had those documents put on to slides that we
11 might -- with your permission, I might go through
12 because I think that that illustrates the application
13 of the concepts that I have referred to and, more
14 particularly, provide some better appreciation of the
15 forest itself, the land base on which that forest
16 occurs, and the development of practices and activities
17 over a period of time.

18 If I might start then with the slide
19 and -- should we move the screen around, or is that a
20 satisfactory...

21 THE CHAIRMAN: I think if you change the
22 angle of the screen just slightly so that it faces the
23 audience a little bit more. We can see it from here
24 quite well.

25 THE WITNESS: Okay.

1 MR. FREIDIN: Q. Now, if I might, Mr.
2 Armson, before you start those particular slides,
3 Exhibit No. 11, which is -- Exhibit No. 11 identified
4 the area of the undertaking as being the area between
5 the red lines, and the evidence of Mr. Monzon was that
6 the area of the undertaking was 385,000 square
7 kilometres.

8 Do you know whether that 385,000 square
9 kilometres that Mr. Monzon referred to as being the
10 area of the undertaking was the total geographical area
11 within the red lines?

12 A. No, that is not the total area, that
13 is the area of Crown lands subject to the undertaking.
14 The total area is considerably larger and is something
15 of the order of 465,000 square kilometres.

16 Q. So the 385,000 square kilometres was
17 the area of Crown land within--

18 A. Yes.

19 Q. --between the red boundaries.

20 A. That is correct, yes.

21 Q. And I understand that Mr. Osborne,
22 who will be one of the panel members in Panel No. 3,
23 will be providing a breakdown or description of the
24 various types of forests that cover that area, what
25 area is land and what area is water, and that sort of

1 thing?

2 A. That is correct.

3 MR. FREIDIN: All right. Thank you.

4 So I guess we need the lights off again.

5 THE WITNESS: Can we have the lights off.

6 THE CHAIRMAN: Sorry, Mr. Armson, what
7 was the figure of the total area between the red lines?

8 THE WITNESS: I think it is 465,000, give
9 or take a little, square kilometres.

10 THE CHAIRMAN: Thank you.

11 THE WITNESS: Now, Mr. Chairman, I will
12 refer to the numbers of what is being shown on the
13 screen in reference to the documents numbered in the
14 text, if that is satisfactory, so that they can be
15 identified.

16 And this is Document No. 1 and it is a
17 map taken from a soil map.

18 MR. FREIDIN: Q. It is actually Document
19 No. 3.

20 A. Is it? Sorry, I stand corrected.

21 And what it shows is the general nature
22 of soils for the country as a whole, but in this
23 particular case we are looking at the soils of Ontario.

24 And I would draw to the Board's attention
25 that the light green area here which runs from a large

1 part of Quebec on this side through the central part of
2 the province, and you notice that the southern boundary
3 down here, more or less, approximates the edge of the
4 Precambrian Shield through central Ontario, Thunder
5 Bay, where we are now, and up through into the area
6 and, in actual fact, well be beyond the area of the
7 undertaking here. (indicating)

8 So that in fact the area from the
9 Manitoba border here and through the sort of heavier
10 green and the other dark green area, at least the very
11 green area here, this is the area referred to commonly
12 as the clay belt.

13 So that you see that within essentially
14 much -- the greatest part of the area of the
15 undertaking, the soils at this scale are described as
16 one type. This does not mean to say there isn't
17 variation, but these are soils of which we term
18 podzolic soils.

19 THE CHAIRMAN: Could you spell that,
20 please?

21 THE WITNESS: Yes. P-o-d-z-o-l-i-c. The
22 word -- many of the words in soils are Russian words
23 and the word podzo is - this is all hardening soil but
24 the pod refers to ash and you will see why in a moment
25 when I show you an illustration.

1 The soils, the pinkish soils down here in
2 southwestern Ontario are soils that are called
3 luvisolic soils, these are the soils we associate with
4 intensive agriculture and so on. This does not
5 distinguish between clay soils and sand soils, shallow
6 soils or deep soils, but it does deal with the general
7 nature of the soil itself.

8 MR. FREIDIN: Q. That area of the clay
9 belt which you indicated in the green, the dark green,
10 perhaps you could just point it out.

11 A. This is the area in here.
12 (indicating)

13 Q. All right. Which is...

14 A. Just south of James -- south of James
15 Bay in a line going down to the east end of Manitoulin
16 Island - perhaps that is the simplest way of describing
17 it - and transected by the the northern CN railway line
18 which you see running across Quebec through...

19 Q. And what are the major centres in
20 that particular area?

21 A. Well, we would have Kapuskasing here
22 (indicating), Timmins just south of that area, those
23 would be two locations, Cochrane over here.

24 Q. And dealing with that light green
25 area which you indicated was the podzolic soils, is

1 there any significance to there being one dominant soil
2 type over that particular area?

3 A. Well, it means that in terms of the
4 activities - and I referred earlier to the impacts, for
5 example, of forest fire, the impacts of silvicultural
6 activities - that we could make some more general
7 predictions about the likely impacts when we are
8 dealing with a broad area in which the -- although, as
9 I say, there may be changes in the soil property,
10 specific ones, in relation to topography and so on, but
11 we can make some rather general predictions about the
12 impacts that are likely to occur on those particular
13 soils, this podzolic area.

14 Q. And -- sorry, that is fine.

15 A. Okay. I would just point out to the
16 Board that one area that has a very specific set of --
17 or different conditions, this clay belt area is one
18 that will be referred to later on by a subsequent panel
19 as to the types of activities that take place.

20 This, for example, is a large area of
21 clay soils in the north and this area is one of organic
22 soils, and these are broad areas where different types
23 of practices are warranted or undertaken.

24 Q. And, Mr. Armson, you indicated that
25 you would be able to have general predictions regarding

1 the impacts on that soil. What sort of impacts are you.
2 talking about when you say that?

3 A. Well, we are talking about the
4 impacts, as I say, for example, in the natural
5 conditions of fire, but more particularly in timber
6 management we are talking about harvesting, we are
7 talking about renewal and regeneration practices,
8 especially those of site preparation where you are
9 actually dealing with the soil and, more particularly,
10 the soil surface, and we are also concerned here -- in
11 general, we can deal with the concerns relating to
12 nutrient cycling and the hydrologic cycling in relation
13 to these type of soils.

14 Q. And When you say nutrient cycling,
15 what do you mean?

16 A. We are talking about the nutrients
17 that are considered essential for plant growth and how
18 they are moved through the soil plant system and what
19 happens to them as they move through and are utilized
20 by the plant.

21 I think perhaps if I may, the next
22 slide -- Mr. Chairman, I thought that this might bring
23 up some questions as to what does the soil look like
24 and this is not in the evidence package and we can
25 provide the coloured picture of this for the Board and

1 for counsel, but I thought that this might be an
2 appropriate illustration of a podzolic soil and some of
3 the attributes that I have been discussing.

4 MR. FREIDIN: Perhaps that can be given
5 an exhibit number, Mr. Chairman.

6 THE CHAIRMAN: All right. Exhibit No.
7 55.

8 ---EXHIBIT NO. 55: Hard copy of slide presentation re:
9 podzolic soil.

10 THE WITNESS: This specifically is a soil
11 in northern Ontario in the northern region, it is in a
12 jack pine stand and what you see here is a base of a
13 jack pine tree that became established after the
14 Matheson fire.

15 So the tree, when the picture was taken
16 and when the excavation was made, was approximately 60
17 years old and the soil that you see here represents the
18 basic elements of podzolic soils, in this case, it is
19 quadripodzol and there are perhaps some obvious
20 features that you can see.

21 First of all, the surface organic layers
22 in which the lesser vegetation is rooted and that is
23 then exposed and you can see that that surface organic
24 material, in fact, is something of the order of two or
25 three inches in thickness. The scale that you see in

1 the photograph, the black and the white or silver
2 divisions are ten centimetre intervals or approximately
3 four inches each.

4 So that the depth -- that is a one metre
5 stick and you see it doesn't come quite to the top, so
6 it is something just over the order of three feet.

7 The materials, and this would be true for
8 all of the area of the undertaking, are in fact
9 materials that were deposited either during or after
10 the retreat of the last ice age.

11 MR. MARTEL: Can I ask a question?

12 THE WITNESS: Yes, Mr. Martel.

13 MR. MARTEL: In general, the depth of
14 that type of soil, podzolic soils, what would that be?

15 THE WITNESS: Well, the depth can vary.
16 This is a deep sand, it was laid down in a lake by
17 water coming off the ice front.

18 There are many instances where, for
19 example, there may be bedrock in at some layer here or
20 bedrock may in fact even be up at this level.

21 (indicating) But the mineral soil - this is the upper
22 level of the mineral soil - in this case, the water
23 laid sand, it could be the material laid down by the
24 ice in its advance, which would usually be very
25 bouldery or varying degrees of stoniness, we call that

1 a till, would be usually either deep, such as this, or
2 it might be shallow -- shallow meaning of some order of
3 magnitude of a third to a metre over bedrock.

4 This could be a clay material. It could
5 be any nature of material, Mr. Martel, and certainly
6 shallowness would come into it, and also differences in
7 drainage. This is a well-drained soil, I have used it
8 as an example.

9 I think the surface organic layer or set
10 of layers here, we refer to as the forest floor, and it
11 has a key function in that it, in fact, is at the
12 interface between the atmosphere, so that rain - and we
13 will be describing this later in terms of the
14 hydrologic site - it is a key factor because it is at a
15 point at which we are usually intervening, either to
16 maintain it or to make some form of disturbance in it
17 to create conditions more suitable for regeneration.

18 If this dries out, then it is not a
19 suitable seedbed. On the other hand, if it doesn't --
20 if we want to in fact plant trees, we don't want to
21 plant them in this, we want to move it out of the way.

22 MR. FREIDIN: Q. And just for the
23 record, Mr. Armson, the area that you are referring to
24 is the organic layer?

25 A. We are referring to the surface

1 organic layers.

2 Q. And that's depicted in this
3 particular slide as the brown area?

4 A. That is the brown -- uppermost brown
5 area.

6 Q. Thank you.

7 A. Immediately below that is this very
8 light coloured area which is the upper surface of the
9 mineral soil which has, since glaciation, been
10 subjected to weathering; weathering from the elements,
11 and that is the climatic element, but also weathering
12 as a result of the materials produced by decomposition
13 in the surface organic layer.

14 The organic layer -- these soils are
15 typically acid, they are acid because the materials
16 themselves are usually acidic and the accumulation of
17 organic materials in that decomposition process
18 produces acid.

19 In the parts of the clay belt in northern
20 Ontario, the western side of the clay belt, the soil
21 materials here are clay and they are calcareous, so we
22 have a different set of conditions.

23 But the point is that in the more -- the
24 acid condition, which is the usual one, intense
25 weathering takes place in the surface mineral soil and

1 that is why it shows light.

2 The minerals: The iron mineral,
3 iron-bearing minerals have been weathered and they have
4 been -- the materials have been translocated downwards
5 to the next level which is the redish/brown or
6 yellowish/brown level, and this is where you have an
7 accumulation of iron, in particular, other elements but
8 more particularly iron.

9 And so we have some weathering and a
10 movement of materials from the surface mineral soil,
11 which is acid, and silica, very high in silica for this
12 one which is more of an iron. And that is the very
13 typical structure in terms of a podzolic soil.

14 Now, you see why the Russians called it
15 podzolic or white ash, because when they disturbed it,
16 what they saw was this silica-rich which looked like
17 the ashes you get from wood ash.

18 Q. Mr. Armson, I understand that you are
19 going to be a witness in Panel 9?

20 A. Yes.

21 Q. And that is going to be dealing in
22 more detail with the significant properties of soils
23 and the influence of those properties on forest growth?

24 A. That is correct.

25 One final point here, if I may, and that

1 is that in the rooting of this jack pine you will
2 notice that there are areas of intensity of rooting.

3 One of the areas that isn't perhaps as
4 evident is this area immediately in the organic layer
5 and immediately below this ash gray layer, but more
6 particularly the level down here at the base of the
7 rod; in other words, at the three or a little more than
8 the three-feet depth, and you see the intensity of the
9 rooting here and that is because the roots have
10 essentially stopped, in this particular instance,
11 because of the firmness of the material, you can't
12 really penetrate it.

13 So the rooting depth in this so-called
14 deep soil is essentially something of the order of
15 three feet or more, although the materials themselves
16 are extremely deep.

17 You will perhaps notice in this corner of
18 the picture there is no ash/gray-coloured material. It
19 is very typical after a fire in a boreal forest that
20 the dead trees eventually are blown over, usually
21 within a few -- they are dead, so the roots no longer
22 maintain the same ability to hold themselves in the
23 soil, and typically these stems, we call them shicos,
24 overturn and in fact that has been a natural form of
25 cultivation that we will be describing how certain

1 species will adapt to that.

2 So this tree you can be pretty sure, in
3 fact, seeded in on what was a mini-disturbed area here
4 from wind throw from the dead trees after the fire.

5 Q. Mr. Armson, Mr. Martel asked you a
6 question about these various soils and you indicated
7 that there could be local variations in the soil even
8 though it was a common type of soil?

9 A. That is correct.

10 Q. Could you just, at this stage,
11 provide Mr. Martel and provide the Board with a list of
12 the sorts of local variations which could occur?

13 What sorts of things are you talking
14 about when you say the soil would vary from one locale
15 to another?

16 A. There would be -- drainage would be
17 perhaps the No. 1 item. This is a well-drained soil
18 and there is no evidence, for example, in this
19 particular soil of impeded drainage, water will move
20 down and through it.

21 So that impeded drainage, whether that be
22 due to some kind of pan here or whether it be due to
23 bedrock or a cavity in the bedrock, would be one of the
24 first items you would look at.

25 The second item would be the depths, and

1 here I would particularly note that the depth is not
2 necessarily the depth in a physical sense - it could be
3 that - but it is the depth in relation to the species
4 you are growing and their particular rooting habit, I
5 referred to silvics.

6 If this had been a picture of even black
7 spruce rooting in this kind of a soil, we wouldn't be
8 looking at roots at this depth. In other words, one
9 could have soil of this nature in which the species
10 occupied only a very shallow zone because that was the
11 nature of the species.

12 So what is a deep soil or a shallow soil
13 isn't necessarily just what we may go out and measure
14 in terms of putting a shovel in; it's whether is it
15 deeper or shallow in relation to the species and the
16 conditions in which you are growing or managing that
17 forest.

18 A third item would be the stoniness or
19 bouldery nature. Many of the forest soils that we deal
20 with in contrast, very complete contrast to agriculture
21 soils, are characterized by stones and boulders.

22 This is one of the areas where there has
23 been a major, if you like, difference between the
24 technologies used to cultivate soil; that in
25 agriculture based on essentially stone-free condition,

1 that in forestry based to a very large degree has to
2 deal with the regulatoring and stone and boulders.

3 The fourth item, and it is tied
4 essentially back to drainage, is the fact that here we
5 are looking at mineral soils - and the majority of our
6 soils are mineral soils - but we do have specific
7 areas; I mentioned the clay belt, where in fact because
8 of impeded drainage the soil is in fact an organic
9 soil. Those would be the main conditions.

10 Q. I see. And I understand again that
11 the importance of those particular factors in
12 silviculture will be discussed in greater detail by you
13 in Panel No. 9?

14 A. And in particular in relation to the
15 nutrient cycling and hydrologic cycling.

16 Q. And just before you go on, I have a
17 few more questions. You indicated that one of the
18 things about podzolic soils -- or two things you
19 mentioned about podzolic soils being common over a
20 certain area was that you could make general
21 predictions regarding nutrient cycling, which you
22 explained, but you also said it had an effect on the
23 ability to make general predictions regarding
24 hydrologic cycle?

25 A. That is correct.

1 Q. And could you explain what you meant
2 by that?

3 A. Well, more particularly, we are
4 looking at the interface between the atmosphere and the
5 manner in which water moves into the soil. It moves
6 essentially in two ways: It moves from the atmosphere
7 through the organic -- surface organic layer, and this
8 becomes extremely important in terms of, first of all,
9 dissipating the energy of the water so that, in terms
10 of erosion, we have a buffer system, if you will, in
11 the surface organic layers which aids infiltration of
12 the water and minimizes, in effect, surface run-off
13 which is really the water caught in terms of surface
14 erosion. So that becomes a very crucial zone.

15 Water also enters the soil - and this
16 again something that is not unique to forests, but is
17 more important with forests - is that a considerable
18 amount of water may enter into the forest soil via what
19 we call stem flow, which is down the stem, and then
20 moves along the root surfaces and, therefore, very
21 rapidly moves along into the lower levels. It is
22 almost as if you had a plumbing system in which the
23 water flowed around the outside of the pipe rather than
24 the inside. These are systems which are taking it back
25 the other way.

1 So that the surface organic layers and
2 the nature of the forest and its rooting abilities in
3 that soil become key items in terms of the hydrologic
4 cycle.

5 Q. And just one last question. If we go
6 back to the first slide which was the slide which
7 showed the areas of the different type of soil - and if
8 you don't feel comfortable estimating, Mr. Armson, just
9 say so - but are you able to approximate or ballpark
10 the area of the undertaking, the geographical area of
11 that 465,000 square kilometres that would have this
12 podzolic soil type?

13 A. It would be -- well, it would be
14 essentially this area in here which is at least 85 or
15 90 per cent of the area in general terms.

16 Again, I would emphasize that within that
17 the conditions of depth and drainage and texture and so
18 on will vary from place to place locally.

19 Q. Thank you.

20 THE CHAIRMAN: Mr. Freidin, I think this
21 might be an appropriate time to take the morning break.

22 MR. FREIDIN: Yes.

23 THE CHAIRMAN: We will adjourn for 20
24 minutes. Thank you.

25 ---Recess at 11:00 a.m.

1 ---Upon resuming at 11:45 a.m.

2 THE CHAIRMAN: Thank you, ladies and
3 gentlemen.

4 MR. FREIDIN: Now, that we have turned
5 off the lights, Mr. Chairman, I would like to file the
6 witness statement for Panel No. 2 and the Document No.
7 21 referred to in the witness statement but which is
8 filed separately.

9 THE CHAIRMAN: All right. Well, the
10 witness statement was already given a number, Exhibit
11 No. 53; and this document, I suppose, can be Exhibit
12 No. 56.

13 MR. FREIDIN: And that document which is
14 going to get the last number is entitled...

15 THE CHAIRMAN: Forest Resources of
16 Ontario, 1986. It has a noted on it: Document No. 21,
17 Panel 2.

18 MR. FREIDIN: And that document was
19 distributed along with copies of the witness statements
20 and I am assuming that everyone has their copy.

21 ---EXHIBIT NO. 56: Document entitled: The Forest
22 Resources of Ontario, 1986.

23 MR. FREIDIN: Q. Mr. Armson, could you
24 put on the slide of the podzolic soil, and perhaps --
25 the one which showed the jack pine. Could you just

1 clarify for me what area is organic and what area is
2 mineral soil?

3 A. The area that is organic is the upper
4 surface layer in this area.

5 MR. FREIDIN: It seems whenever Mr.
6 Armson wants to begin speaking there is horns and
7 whistles.

8 THE CHAIRMAN: Well, the next time we
9 have a fire alarm, I hope everyone before they leave
10 will grab whatever exhibits they have so we do not lose
11 the whole works.

12 THE WITNESS: As I was saying, Mr.
13 Chairman, before the bells went off, the area that is
14 referred to as the organic part of the soil is the
15 surface layer which you see in which is the lower
16 boundary.

17 The mineral soil encompasses both the
18 very light-coloured material here, that is the surface
19 mineral soil there, and the then red, yellow-brown
20 beneath it. The term soil, in the strictest sense, is
21 used for that part of the material in which the rooting
22 occurs of whatever vegetation.

23 So that the mineral soil extends from the
24 lower boundary of the surface organic layer right
25 through to the, in fact, lower depth of rooting. Below

1 that it is essentially geological material; water laid
2 sand, water laid clays, sills and so on.

3 MR. FREIDIN: Q. Thank you. Now, Mr.
4 Armson, could you describe for the Board the forest
5 regions of Ontario of which, I understand, there is
6 more than one?

7 A. Yes, I will go to the slide
8 projector.

9 Again, the forest regions of Ontario are
10 part of the forest regions of Canada with the exception
11 of the one referred to here as the deciduous forest
12 region which is unique to Canada. This is the only
13 area of its type in the country.

14 The forest regions that comprise within
15 the area -- that existed within the area of the
16 undertaking are the ones that are coloured an orangey
17 colour right here, light orange, which in fact is the
18 lowermost boundary of the area of undertaking in here.
19 (indicating), it comprises the lower part and also the
20 lower part of the northwest.

21 And, we in Thunder Bay, are interestingly
22 right at the juncture of the Great Lakes-Saint Lawrence
23 forest region, and the dark green one here, which is the
24 boreal forest and, by and large, comprises the largest
25 part of the forest area of the province.

1 Q. If I could just interrupt. This
2 particular slide is on page 47 of the witness
3 statement.

4 A. What you will see is very roughly,
5 something of the order of 65 per cent of the area of
6 the undertaking is in the boreal forest region and the
7 balance, 35, or something of that order, in the Great
8 Lakes-Saint Lawrence.

9 Q. And do you have any photographs which
10 would give a general indication of what these areas
11 look like?

12 A. Yes, I have three photographs which
13 are in the document and which are referred to there and
14 I can't think of the number.

15 Q. The document 5(a), (b), and (c) which
16 start on page 48?

17 A. This is an aerial view of landscape
18 just north of Lake Erie in southwestern Ontario showing
19 the nature of the deciduous forest region in general
20 terms.

21 Deciduous forests, in other words, these
22 are species in which the leaves fall annually in the
23 autumn. It comprises a number of species, and I will
24 point out to the Board that there are certain species a
25 that range right from the deciduous region right

1 through into the boreal region, one of those being the
2 provincial tree, the white pine.

3 But the species that are characteristic
4 of this area are broad-leaf species which is: sugar
5 maple, beech and, more particularly, species that we
6 refer to as the carolinian species; the tulip tree,
7 sassafras, a large number of oaks -- relatively large
8 number of oak species and so on, which magnolia --
9 native magnolia which occur in this area.

10 And it is not atypical in that area with
11 the intense agriculture to have the deciduous forest
12 interspersed with the arable land beside it.

13 Q. And the deciduous forest is
14 completely outside of the area of the undertaking?

15 A. That is correct.

16 Q. And I understand that these
17 particular forest regions are summarized in Paragraph 8
18 of the witness statement?

19 A. That is correct. Let me get my
20 glasses out so I can -- yes.

21 The Great Lakes-Saint Lawrence region
22 which, as I say, comprises something of the order of 35
23 per cent of the area of the undertaking, is a region in
24 which, again, sugar maple, yellow birch, white birch,
25 poplars, basswood and red oak are the deciduous

1 species, again species that are also common or occur in
2 the deciduous region, but here: the red pine, the
3 white pine and in the northern part of it and certain
4 types of soil conditions jack pine also occur, in
5 addition to white spruce and tamarack and so on.

6 It is characterized, as I think you are
7 well aware, by a rather colourful condition in the fall
8 and which is, of course, very attractive. This is a
9 general view in the central part of the province in
10 that area.

11 You notice within it, in this particular
12 picture, in the fall the white pine shows up
13 particularly well in this picture. You can see white
14 pine here and here (indicating), another one over here,
15 white pine over here.

16 And, in fact, it is interspersed, a
17 mixture of pines and other conifers with the hardwoods
18 which, I think, gives this Great Lakes-Saint Lawrence
19 region this characteristic, I guess, attractiveness to
20 painters and to other people and also the change of the
21 seasons makes it very...

22 The third forest region, the boreal forest
23 region, as I say, comprises the greater part of the
24 area of the undertaking. This is an aerial photograph
25 just north of Sioux Lookout and I think here one gets

1 the sense of expansiveness.

2 This is an area, incidentally, north of
3 Sioux Lookout in which there has been no activity, no
4 industrial activity and it is characterized, as you
5 see, by conifers rather than hardwoods, although the
6 hardwoods do occur there; poplar, they are we are
7 talking about trembling aspen in particular, and the
8 major conifers; black spruce and jack pine and
9 interspersed white spruce throughout this area, with
10 some maple, birch depending on the area.

11 MR. FREIDIN: And just perhaps for the
12 record, Mr. Chairman - and if you wish I could do it as
13 we go along - I think perhaps when the slide goes up I
14 should indicate what page of the witness statement it
15 shows up on.

16 So the picture of the deciduous forest
17 region is page 48, the Great Lakes-Saint Lawrence is on
18 page 49, and the last picture, which is the boreal
19 forest, is on page 50 of the witness statement.

20 Q. Mr. Armson, perhaps you could turn
21 off the machine and I was going to ask you a few
22 questions about these particular regions.

23 Mr. Armson, can you make any general
24 observations or comment regarding the predominant
25 species in the individual forest regions,* and I am

1 concerned with the two forest regions which fall within
2 the area of the undertaking?

3 A. Well, these are species - for
4 example, in the Great Lakes-Saint Lawrence, in terms of
5 development that we will be discussing later on - the
6 species in the boreal forest we are talking of the jack
7 pine and the black spruce and the white spruce, but
8 particularly the jack pine and black spruce and the two
9 pines; red and white pine.

10 These are the species that their life
11 processes and their regeneration, under natural
12 conditions, have become adapted to fire. They, in
13 fact, their dependence for regeneration to any
14 significant extent depends on fire and has depended on
15 fire since the last ice age, some eleven or more so
16 thousand years ago.

17 I think that this factor - and again we
18 come back to the characteristics of the silvics of the
19 species - becomes then a very important area of
20 knowledge for foresters in making decisions about what
21 type of silviculture to plant.

22 Q. And perhaps you could give an example
23 of how that factor or area of knowledge can be used in
24 that way?

25 A. Well, for example, the best example

1 would be jack pine in which the cones - we refer to
2 them as serotinous cones; that is, the main cone is on
3 the tree as distinct from the white pine or red pine
4 which mature in two years, and then all the trees open
5 up and the seeds fall out.

6 The jack pine, the cones remain on the
7 tree, they remain closed and, in fact, do not open
8 until there is a very high temperature reached which,
9 in fact, can be done too by having a fire pass through
10 this land and then the cones open up and shed the seeds
11 after, of course, the fire has passed through.

12 Black spruce has the same characteristic.
13 We utilize that factor, first of all, in an area of
14 mature forest in which the fire occurs and we are
15 dealing with jack spine and black spruce, when we
16 recognize when fire passes through there will naturally
17 be regeneration of that area by those species.

18 Poplar is another example in that the
19 surface reproduces not so much by seed but by suckling
20 from the roots and, in fact, the organic layers often
21 the upper portion is burnt, the poplar roots are very
22 superficial, they are in there, and the increased
23 temperature stimulates a suckling from those roots so
24 it is not unusual to have a great increase of suckling
25 in poplar following a burn. If the burn is very

1 intense, then indeed some of those roots may be
2 destroyed.

3 Q. I understand the subject matter you
4 are discussing is referred to in paragraph 13 of the
5 witness statement?

6 A. Yes, that is where we deal with that
7 in some detail. I would like to perhaps point out to
8 the Board that in looking at the forest, particularly
9 the factors, and I referred to the species' and their
10 adaptation to these factors, we are also concerned very
11 much with relating that to our ability to predict what
12 will happen, as I mentioned, to the forest after
13 natural fire of a certain type through a mature forest
14 of jack pine.

15 We believe do know with a high
16 probability that that will regenerate. If there is
17 recurring fire other things can take place.

18 Q. Perhaps we can come back to the
19 matter of this particular species adapting in a moment.

20 If we could go back and deal with the
21 predominant species in the two forest regions, the
22 boreal and Great Lakes-Saint Lawrence. I understand --
23 I also want some indication of not only the species,
24 but their distribution which ones are most predominant
25 and which ones are not?

1 A. In the Great Lakes-Saint Lawrence we
2 are dealing very much with hard maple or sugar maple as
3 the predominant deciduous species.

4 There is, particularly in the southern
5 part of the Great Lakes-Saint Lawrence, some beech but
6 more particularly of interest over the decades has been
7 yellow birch, a species which is deciduous and has been
8 used particularly from the late 1930s on in the forest
9 products industry.

10 Q. Are the various species of trees
11 which appear in those two forest regions, the boreal
12 and the Great Lakes-Saint Lawrence, described in
13 Exhibit 56, The Forest Resources of Ontario?

14 A. They are.

15 Q. And I am wondering - and I believe
16 you will find that description starting on
17 approximately page 27 - and I am just wondering, Mr.
18 Armson, whether you could take the Board through that
19 document and that portion that deals with the various
20 species and indicate the percentages of the growing
21 stock which are represented by each species?

22 A. The document that you have is the
23 quantification, if you will, of the forest estate. And
24 in this document it also deals with the division by
25 ownership, which you will see on page 26, and you will

1 notice it is in the form of a graph on page 26 and most
2 of the -- whereby the vertical axis shows either volume
3 or area and, in this case, in Figure 12 on page 26 it
4 shows the division, the amount of total volume in terms
5 of ownership, and you will notice that, as might be
6 expected, the something over 4-billion cubic metres is
7 in Crown land.

8 Q. And this particular graph is not for
9 the area of the undertaking but for the province as a
10 whole?

11 A. That is for the province as a whole.

12 MRS. KOVEN: Excuse me, what is patented
13 land?

14 THE WITNESS: Patented land is private
15 land, it is the term that we use to refer to private
16 land, whatever the ownership may be in that.

17 Page 28, pass by the text on 27. Page 28
18 again shows the same volume broken down now by -- into
19 not only ownership but more particularly into three
20 categories of, if you like, tree species and these are
21 grouped together.

22 The softwoods are those which we also
23 refer to sometimes as conifers. These are the species
24 such as the spruces and the pines and the tamaracks and
25 the cedars and so on.

1 The word softwood and the word hardwood,
2 I think you may be aware, doesn't necessarily refer to
3 whether the wood is hard, it refers to these categories
4 of species.

5 The second category -- and there are two
6 categories of hardwoods, one called intolerant and the
7 other tolerant. What this refers to is the ability of
8 the species to withstand shade and a species such as
9 basswood, red oak, the poplars which require and, in
10 fact, will not tolerate shade we call intolerant
11 species.

12 The other species that we call tolerant
13 hardwoods are those characterized by sugar maple, by
14 beech, corn bean, species such as that which in fact
15 will grow in light, but they can also grow, though not
16 nearly as well in relatively dense shade. So we call
17 them tolerant hardwoods. And that has some bearing on
18 the silvicultural decision which you will be hearing
19 about later on.

20 So those volumes are shown in Figure 13,
21 and you will see that to a very large degree the
22 largest portion of the growing stock volume - the
23 growing stock term refers to all the volume - is in
24 softwoods followed by the intolerant hardwoods and
25 finally by the tolerant hardwoods.

1 Q. Am I correct that a layman's way of
2 describing the difference between the softwoods and the
3 hardwoods would be: Some have pine needles on them and
4 the softwoods have leaves?

5 A. That's right they are broad leaves.
6 Another term that you would find in this document which
7 is used very specifically in Ontario in relation to
8 describing the forest quantitatively is the term
9 working group.

10 I think the Board will realize from the
11 picture of the three illustrations, that within that
12 forest that may look like a broad green forest there
13 are many species, and in putting together quantifying
14 the forest - and the Board will be given some detail of
15 how this is done in the next panel, in Panel 3, dealing
16 with the inventory - what we do is we aggregate groups
17 of trees that we can identify as being essentially very
18 similar, we call them stands.

19 We aggregate the stands with similar
20 characteristics and similar combinations of species
21 into what we call a working group, which is merely a
22 means of aggregating data upwards from a stand level
23 into a larger group and we refer to that then as a
24 working group and we give it the predominant species
25 name.

1 So that when, on page 30 and Figure 14,
2 we are looking at the growing stock volume by working
3 group, and you will notice that the symbols identify a
4 species name to the right, pw is white pine, pr is red
5 pine. It doesn't mean that that working group consists
6 only of white pine or only of red pine but is the
7 predominant species that may be mixed with other
8 species of other conifers or softwoods or hardwoods.

9 And you will notice then in that figure
10 that the predominant working group, by volume, is in
11 fact the spruce working group. We lump the two spruces
12 together, we don't distinguish between the black spruce
13 and white spruce working groups, we put those together.

14 And the second largest is that of poplar.
15 These, of course, the spruces and the poplars are
16 predominant in the boreal forest region, although they
17 are also occurred in some of the -- in the other ones.

18 Q. Mr. Armson, I understand that Dr.
19 Osborne will be describing working groups perhaps in a
20 bit more detail, but just before we leave that can you,
21 in a general way, indicate what significance there is
22 to aggregating these stands and characterizing them or
23 giving them a label as a working group?

24 A. Well, there are a number of reasons
25 for doing that. First of all, in moving to a different

1 scale or level of quantification it enables us to do
2 that. It also pulls together, in a quantifiable way,
3 stands with very similar attributes in terms of the
4 specie composition and, therefore we can, again in our
5 general planning and dealing with, if you like,
6 predictability of a forest in a quantifiable sense, use
7 those components at the working group level.

8 There are other breakdowns which we will
9 be coming to later in this document. I think it is an
10 area that's fairly technical. It will be dealt with in
11 more detail in Panel 3.

12 THE CHAIRMAN: I think this treatment of
13 it is satisfactory.

14 THE WITNESS: So if we move to page 32.
15 Having looked then at the amount of the growing stock
16 volume by working group for the province - this is
17 totally for the province - what we have done on page 32
18 is segregated that data by the regions of the Ministry.

19 So that you can by regions - and keeping
20 in mind that the five regions are: To the left, the
21 northwestern, as identified across the vertical axis;
22 the northcentral region is where we are presently
23 located; the northeastern on the east of us; the
24 northern region is the area generally from Sudbury on a
25 line from Sudbury to North Bay across to Wawa, this is

1 a general area; the Algonquin area region. Those are
2 the five regions essentially within the area of the
3 undertaking.

4 And you will see there in the three
5 regions northwestern, northcentral and the northern
6 region the softwoods are, by the way, the predominant
7 working group by volume, and it is only in the
8 northeastern and Algonquin regions that the tolerant
9 hardwoods are of any extent. In Algonquin they
10 comprise the majority.

11 The percentage of growing stock, as shown
12 on page 33 - the totals are shown on page 32 - the
13 percentage of the region growing stock, this merely
14 re-emphasizes the importance.

15 There is a typographical error in 16. It
16 says: Growing Stock Volume of Pj, Sb and He, black
17 spruce, jack pine and hemlock, but it should read
18 balsam fir Bf. The balsam fir is indicated in the
19 bottom of the graph and that's accurate, but there is a
20 typo there.

21 Q. That particular figure, Figure 16,
22 sort of relates to your earlier evidence regarding the
23 predominance. Does it relate to your evidence
24 regarding predominance of the area species?

25 A. Yes, it does. The black spruce, here

1 you can see is in all of the four northern regions,
2 which is the predominant growing stock.

3 Q. Jack pine being second?

4 A. Jack pine is second and then the
5 balsam fir, and certainly softwood is third.

6 Q. In terms of the northeastern and
7 Algonquin regions on Figure No. 17, which working
8 groups are the predominant working groups there?

9 A. There the white pine in the
10 northeastern and Algonquin is the predominant working
11 group, with the red pine in northeastern being the
12 second, but hemlock is third of the softwood working
13 groups. For those two regions then, white pine becomes
14 the predominant concern.

15 Q. And in the Algonquin region, what do
16 we have in Figure 18 and 19 then?

17 A. In figure 18 and 19 we have the
18 growing stock by poplar, by white birch and by cedar --
19 pardon me, other conifers, and what this says is the
20 poplar - if you take even down into the southern
21 regions - certainly in the regions of the area of the
22 undertaking, poplar and white birch, two intolerant
23 hardwoods, are predominant in terms of the growing
24 stock of that percentage.

25 Q. So if we look then at the northerly

1 regions we have a predominance of black spruce and jack
2 pine in the conifer species?

3 A. That's right.

4 Q. What are the predominant hardwood
5 species found in those northern regions?

6 A. In there the poplar and white birch
7 are the predominant intolerants and the northern region
8 also extends into the Algonquin and northeastern
9 region, but they are mainly tolerant hardwoods.

10 Q. And the predominance of the hard
11 maple in the Algonquin region and the northeast, I
12 understand, is what is depicted in Figure 19?

13 A. That is correct, on page 36 that is
14 where that is depicted.

15 Q. Mr. Armson, in a very general way,
16 can you comment on the predominant use of those
17 species, and I am talking now when we deal with the
18 more northerly regions and the four types you have
19 indicated; spruce, jack pine, white birch and poplar?

20 A. The predominant use, in terms of the
21 forest products industry, it is spruce and with jack
22 pine. The largest single use would be for the pulp and
23 paper industry, although the jack pine and spruce are
24 also used for the saw timber industry. Poplar...

25 THE CHAIRMAN: What was that last term,

1 sir?

2 THE WITNESS: With the saw timber
3 industry.

4 THE CHAIRMAN: Saw timber.

5 THE WITNESS: That is the jack pine and
6 the spruce.

7 The poplar - and here we are speaking
8 primarily of one species trembling aspen - the poplar
9 has been a species in the boreal region in the northern
10 part which, up until very recently, did not have any
11 major utilization. There again technology enters into
12 this, and up until - I might almost say the late 60s
13 and early 70s - there was little use, if any, in much
14 of the area.

15 That has changed very dramatically, and
16 the utilization of poplar in Ontario, and particularly
17 in the northern region, has increased I think over the
18 past ten years, something like a matter of fourfold,
19 something from a few hundred thousand cubic metres a
20 year to over 2.5-million in something like a ten-year
21 period. And that has been primarily for two uses: One
22 is the waferboard use and the other is for use in the
23 pulping process for paper.

24 In the Great Lakes-Saint Lawrence region,
25 I will be describing --

1 Q. I was just wondering, you didn't
2 mention white birch.

3 A. Oh, white birch is still a species
4 that there is relatively minimal usage. It is used in
5 certain limited quantities for use in the old days for
6 popsicle sticks, and tongue depressors and all these
7 kinds of things require white wood, very easily
8 machined and it is used for small turnery and this type
9 of product, but only in very, very small....

10 Q. Used for small what?

11 A. Turnery, where you want to turn the
12 materials into small objects, dull that is used for wax
13 and so on.

14 Q. Hockey sticks?

15 A. No, I don't think white birch is used
16 much for hockey sticks.

17 Q. Okay. And could we go to, I guess,
18 the northeastern and the Algonquin region.

19 A. The northeastern and the Algonquin
20 regions, well, the predominant species there is the
21 hard maple, again used in the saw milling industry.

22 But within the last few decades,
23 depending on the mill, it is used for the pulping
24 process, particularly a certain amount of fine paper.

25 I mentioned the Domtar Mill at Cornwall

1 which is outside the area of the undertaking, but
2 utilizes what we call heavy hardwood. Other mills,
3 there are very few in Ontario that utilize that
4 material, but mainly it is used for flooring and this
5 type of thing.

6 There are, again, to give you some
7 indications, specialty markets arise and, in the 1960s,
8 bowling became a major recreational pasttime in Japan
9 and I can recall with the production of hard maple for
10 export bowling pins and bowling alleys to Japan had a
11 very marked effect on the price of maple from private
12 woodlots in southern Ontario and also the marketing.
13 So this is again an area where it comes into play.

14 The other example in terms of a hardwood
15 would be yellow birch, one of the intolerant hardwoods,
16 and it is a species which was utilized primarily in the
17 late 30s and then what gave it its greatest impetus was
18 World War II and it became used then as a skin that was
19 used in plywood for mosquito bombers. Following the
20 war, it then became used, many people would recognize
21 it, as a plywood used in furniture and the resource,
22 the mature yellow birch, it was of quality, high
23 quality for veneer, was exploited very rapidly within
24 that area.

25 Q. Now, Mr. Armson, could we move on

1 to -- there is a section in the witness statement,
2 paragraphs 9 to 14, where you describe various things
3 which cause change in the forest and could you - before
4 you describe those particular changes in the forest -
5 could you advise why you are telling us about those
6 matters?

7 A. Yes. Again, I would come back to
8 emphasize the importance of a knowledge, not only of
9 the species, but their response and the dynamics of the
10 response by species and by forests to both internal and
11 external factors, and I will describe those in a
12 moment.

13 First of all, if we don't understand it,
14 we cannot predict with any reasonable degree of
15 certainty what the future development will be for a
16 forest; in other words, if we don't understand in the
17 broader sense the effects of these factors and the
18 species responding.

19 Secondly, in planning timber management
20 activities, we have to take those most probable events
21 and most probable developments into account. If we
22 don't do that, then we are likely to make some very --
23 some poor judgments. And so related to the knowledge
24 of the dynamics, is how we can then interpret those
25 dynamics with respect to the objectives of management

1 for a given area and the most probable course of events
2 that will take place, both resulting from natural and
3 uncontrolled disturbances and also from our own
4 activities.

5 And then I think the -- perhaps the key
6 to this is a knowledge - coming back again to the
7 species of how when we carry out those activities, how
8 the species with which we are particularly concerned
9 will respond to what we do. This is over and above the
10 planning, this is the actual activity itself.

11 And as I will be coming back to you, that
12 depends to a very large degree on, not only local
13 knowledge and experience, but particularly the bringing
14 to that of the professional expertise and the
15 development of that expertise in a set of conditions.

16 So those three elements; the ability to
17 predict, the ability to relate the dynamics to the
18 planning process itself; and, thirdly, to put the
19 species that we are primarily concerned with in that
20 context and recognize how they can respond.

21 I refer, of course, to the type of
22 reproduction of jack pine and black spruce in relation
23 to fire. There are many, many other examples I could
24 go into, but I think I will leave that for a subsequent
25 panel.

.

1 Q. Could you provide an example of how
2 you might use knowledge of dynamics, the dynamics in
3 the forest, in making a management decision?

4 A. Well, one of the perhaps best
5 examples I could give is related to what I would call
6 internal factors of growth and change.

7 Trees and forests grow, they increase in
8 size. You saw an illustration earlier this morning,
9 the root system; that tree started out as a seedling,
10 its roots expanded, exploited the soil, the tree
11 increased in size, it not only increased in size, but
12 its foliage increased so its demands for water and so
13 on increased.

14 At some point, no matter what the soil,
15 there is an inability for the amount of water that is
16 moving into that plant to satisfy the demands of the
17 plant. So at that point, we say the plant is
18 biologically stressed and -- in other words, you just
19 think about it as a human being or any biological
20 organism that grows, increases in size, and then in
21 terms of its requirements in demand it outgrows what is
22 the supply.

23 At that point, we say it is not only
24 mature; if it goes on as a result of this stress, it
25 usually becomes debilitated, often disease occur and we

1 in fact have then an over-mature situation, and so on,
2 sets in. And one of the principles in dealing with the
3 management of timber is obviously to ensure - concerned
4 with a typical action - to ensure that the forests are
5 harvested before it gets into the period of decay.
6 There is not much point in sawing lumber out of unsound
7 logs, and not much point in trying to make veneer out
8 of trees that have got rot in them.

9 So that we are concerned about that stage
10 of development. That stage of development will be
11 reached for the same species in different conditions.
12 And I think you would understand that the more
13 productive, the more fertile the soil, the more rapid
14 the growth and, therefore, the more rapidly in which
15 the organism reaches that point of maturity.

16 So that if we have in a large forest area
17 a concern in terms of the distribution of the
18 harvestable crop, areas where, say, for black spruce,
19 we say it is a hundred years of age or 80 years of age
20 mature, there is a large amount of it, we can't harvest
21 it all, we haven't got the capacity to harvest it all,
22 the demand may be there.

23 Where are the areas of that forest that
24 we will forego harvesting we will, in effect, store on
25 the stump. And what we know intrinsically is that the

1 areas of poorer site quality, the areas of lower
2 productivity, are the areas where we can afford to
3 store for a longer period because, in fact, the trees
4 don't normally deteriorate as fast on the poorer sites
5 as they do on the more productive and fertile soils.

6 So that if a forest manager has an
7 opportunity to make a decision about where to store
8 wood, he will then relate that back to, what I will
9 call, the internal factor of growth and the nature of
10 the site in which it is growing and this is -- we have
11 done studies on this and quantified this particular
12 feature and it brings in then the nature of the land
13 and the soil very much into the planning process.

14 Q. And you used the phrase "the internal
15 factor of change."

16 The Paragraph 11 describes or deals with
17 basic internal factors. Is that the subject matter
18 that you have just finished describing in terms of
19 trees growing, beginning to deteriorate, and that sort
20 of thing?

21 A. That's right, and I will be -- for
22 the Board's interest, I will be developing that in
23 Panel 9 at some length.

24 Q. You gave -- or you referred to a tree
25 reaching an age where it was mature. What does mature

1 mean in timber management parlance?

2 A. Well, mature means many things. I
3 referred to it in terms of biological maturity, we
4 could refer to it in terms of maturity related to size
5 or economic maturity. In other words, in terms of
6 growing a forest of a certain species, we can say that
7 a certain diameter, whether we achieve that on a site
8 over a longer period of time or whether we achieve it
9 on a more productive site over a shorter period of
10 time, but we can say that that dimension becomes an
11 important one, particularly important in terms of
12 certain forms of utilization.

13 Q. What does the term "rotation age"
14 mean in timber management?

15 A. The rotation is the time in years
16 that -- in terms of the management and the management
17 plan and to meet the objectives of that management plan
18 is decided upon as the period over which the trees will
19 be generated and then subsequently harvested.

20 Normally, in the boreal forests we are
21 looking at orders of magnitude of 70 to 80 years for
22 jack pine, 80 to a hundred years for spruce, this type
23 of thing.

24 MR. MARTEL: Could I just ask a question.

25 THE WITNESS: Yes, Mr. Martel.

1 MR. MARTEL: Could those numbers change
2 dependent on the type of site preparation, the type of
3 tending, and so on that go on?

4 In other words, if you just -- can you
5 reduce the factor by 10 or 15 years or 20 years if in
6 fact you put more into the regeneration process?

7 THE WITNESS: Yes. There are two ways of
8 reducing it. One could, of course, lengthen it if one
9 wanted to as they have done in Germany with oak where
10 they wanted it for...

11 The two ways -- you have referred to the
12 one group of ways in which you, in fact, site prepare
13 so that the density of the trees on the area is much
14 less than what may have occurred in the natural forest.

15 So that you, in fact, achieve then
16 diameters at earlier ages and provide for the trees
17 that you are interested in a larger growing space than
18 would occur in an unorganized or unmanaged state.

19 And then there are treatments that can be
20 made, although we -- such as, pre-commercial thinning,
21 to take a dense stand and thin it out so that we
22 increase the -- not so much the overall total growth,
23 but where that growth is placed upon the -- as if you
24 had, I have often used the analogy of the number of
25 hogs at a trough.

1 If you have a trough of defined size and
2 you have a large number of hogs and a certain amount of
3 feed, you get at lot of little hogs, but if you only
4 have a few -- you may get no greater total amount of
5 pork out of it, but you get it all in big hogs.

6 Well, that is the same with trees.

7 THE CHAIRMAN: Well, Dr. Armson, we are
8 getting to the point where the hogs here should be
9 going to the trough very shortly. So that perhaps
10 after you finish explaining this point, we could break
11 for lunch.

12 THE WITNESS: One quick point, Mr.
13 Chairman, and that is the other area, though, is in
14 selecting out, through tree improvement - and I
15 mentioned earlier the Ontario Tree Improvement -
16 selecting out individuals from the natural forest and,
17 in fact, bringing those together by a breeding process,
18 creating, if you like, individuals that then have the
19 ability to grow faster.

20 So that is from the genetics or from the
21 tree improvement side as, again, we have done in
22 agriculture.

23 MR. FREIDIN: And, Mr. Martel, the panel
24 which will be dealing with the activity of renewal --
25 pardon me, maintenance will be dealing with activities

1 which occur in stands in order to improve growth.

2 I think this would be a convenient place
3 to stop, Mr. Chairman.

4 THE CHAIRMAN: Very well, Mr. Freidin.
5 The Board will rise for lunch until 2:00 p.m.

6 Thank you.

7 ---Luncheon recess at 12:40 p.m.

8 ---Upon resuming at 2:05 p.m.

9 THE CHAIRMAN: Thank you, ladies and
10 gentlemen. Be seated, please.

11 MR. FREIDIN: Q. Mr. Armson, when you
12 had that picture of that jack pine up there which
13 showed the root structure--

14 A. Yes.

15 Q. --you made a comment about that
16 particular tree was rooting in the mineral soil. Do
17 all trees root in mineral soil?

18 A. No. In fact, some trees are well
19 adapted to rooting in nothing but organic soil, black
20 spruce is one, tamarack would be another. They can
21 root in both mineral or organic, but they often,
22 because of the nature of the soils, root in nothing but
23 organic material.

24 Other plants also may root either by
25 preference or mainly of necessity in nothing but the

1 organic layers.

2 Q. Now, Mr. Armson, I understand that
3 you have on the slide projector a number of pictures
4 that describe or depict natural external agents of
5 change; is that correct?

6 A. That is so.

7 Q. Perhaps we could have the lights
8 turned out and you could deal with those particular
9 slides.

10 A. I think the Board will recall that I
11 referred to a number of external factors, as well as
12 the internal factors of growth, maturity and decline
13 and decay and ultimate death.

14 One of the major external factors, and I
15 have referred to the adaptability of certain species to
16 this one, is that of fire. And here we are talking of
17 natural fire or man-caused fire, but fire which is not
18 occurring as a result of some planned action. And this
19 is a picture of Red Lake 7, the fire of the early
20 summer of 1986.

21 A second external factor would be that of
22 wind. Again, when stands -- and one of the features of
23 fire, of course, is that the new vegetation and the new
24 forest comes on essentially as an even-aged stand, so
25 it grows and matures and as it becomes over mature, it

1 becomes susceptible, not only to fire again, but also
2 to other factors.

3 And, in this case, this is an example of
4 wind. There was - I presume from the nature of the
5 fact that there is a very sharp edge - it was a tornado
6 path and these are very common in the boreal forest.
7 And they then create conditions that make it (a) either
8 more susceptible to fire, in which you have slash on
9 the ground, that can dry out, and also, of course, to
10 disease.

11 Q. Do you know where that picture was
12 taken, Mr. Armson?

13 A. This was taken in northern Ontario.
14 I can't be sure of the exact location. I think it
15 is...

16 Q. Document 6B.

~ 17 A. 6B? No, it is from the Ministry's
18 photo library and it is just identified as northern
19 Ontario. This is a poplar stand or an aspen stand, but
20 where in northern Ontario, I don't know for sure.

21 Q. Could you advise the Board in general
22 terms what factors would influence whether a blow-down
23 such as this could occur?

24 A. Yes. One of the key factors would be
25 the susceptibility because of the age of the stand and

1 its over maturity. At that point, it becomes, in
2 effect, like a flag pole in which the foundation, the
3 roots are weakened. Often one of the initial signs of
4 debility in a tree or in a stand is loss of roots, the
5 fine roots go and they become susceptible to blow-down.

6 Q. I am just wondering, Mr. Armson, if
7 you are finished with that particular slide, if you
8 could go back to the photograph of the wild fire.

9 A. Yes, there we are.

10 Q. And before we leave that, could you
11 indicate the major causes of fires of that type?

12 A. I believe the major cause of wild
13 fire is actually the man or the human being in this
14 case. They cause more fires; that is, in terms of
15 numbers of fires. Lightening would be the second major
16 cause, I believe.

17 Q. And I hear the railway out there
18 going by. Does that ever come into play?

19 A. Yes, they come into play and, of
20 course, the old steam locomotives, they were a major
21 cause of forest fires.

22 THE CHAIRMAN: How do you stage manage
23 this, Mr. Freidin?

24 MR. FREIDIN: It is the federal
25 government. I have no influence at all.

1 MR. MARTIN: Do you have a train
2 schedule?

3 MR. FREIDIN: No, no, sir. But we can
4 enter it as an exhibit.

5 Q. In terms of those particular causes,
6 and I am thinking particularly in relation to
7 lightening, are fires which start as a result of
8 lightening any more frequent in one part of the
9 province as opposed to the other?

10 A. Generally, northwestern Ontario has a
11 higher frequency of lightening-caused fires, that's
12 because of the climatic conditions, especially those
13 that prevail in the early part of the season as we
14 noticed yesterday, very hot with warm winds and a
15 thunderstorm when lightening strikes is very prevalent.

16 And also the nature of the vegetation
17 with a high predominance of conifer vegetation you
18 have, in fact, a fuel that can ignite very rapidly, as
19 compared to the Lake Greats-Saint Lawrence region with
20 the hardwoods, the broad-leaf species, are less
21 susceptible.

22 Q. Can you give the Board a general
23 indication regarding the area which could be lost to
24 wild fires on a yearly basis?

25 A. The area will vary. I think in the

1 statistics of the Ministry, you will find that from
2 year to year they may vary. I think, if I recollect,
3 from the early 80s, you will find one year there,
4 something of the order of 500,000-hectares in one year.

5 Some fires, for example, may be of a
6 100,000 or more hectares, and then the next year -- one
7 year in there in '84 or '85, somewhere in there,
8 600-hectares for province for the year.

9 In other words, just total total change
10 in the order of magnitude and that would reflect
11 weather conditions to a very large degree.

12 So the year-to-year variation is very,
13 very remarkable, and this has quite a considerable
14 impact, obviously, in terms of timber management
15 planning.

16 And as you will see later on this
17 afternoon, where an area of mature timber plan has been
18 planned for and allocated for harvest, roads built and
19 so on, it may be that fire in one year can wipe out
20 that entire area or a good part of it.

21 So it means that both in our planning and
22 our ability to then amend the plan and move to another
23 area, that has to be a factor.

24 I talked earlier, Mr. Chairman, about the
25 predictability and most probable sequence. One of the

1 most probable things we know in planning timber
2 management planning activities, especially in this
3 area, is that fire can be a constant factor that will
4 come in and, in fact, change both the area and the
5 allocation, therefore, the whole range of activities
6 associated with it.

7 Q. Are you able to approximate -- now,
8 first of all, that figure you gave in terms of the
9 variation from 500,000 - I am not sure what the largest
10 number was that you gave - but was that for the
11 province?

12 A. That was for province. Within any
13 one area, as I mentioned, one single fire in
14 northwestern Ontario could be of the order of
15 100,000-hectares, 50,000-hectares. And that might be
16 set, incidentally, in relation to the total area
17 harvested from the area of the undertaking or -- in
18 terms of Crown lands, we are dealing there with an
19 annual level which is large, which is something of the
20 order of 200,000-hectares a year.

21 So in any one year, it may be a few
22 hundred hectares that are harvested by fire, if you
23 will, to something like twice the area that is
24 harvested.

25 Q. Thank you.

1 A. If I might, I would like to show you
2 a series of slides and then two sets of LANDSAT
3 imagery. Both the slides and the imagery are contained
4 in the document and, Mr. Freidin, you can read more
5 clearly than I can, the elements.

6 I have mentioned fire and blow-down. The
7 third major external factor - there are others - would
8 be insects and this is an aerial view of a boreal
9 forest in which you have a stand which contains both
10 intolerant hardwoods, the poplar, and some birch in
11 there, and the conifer content was balsam fir and
12 spruce.

13 You can see in here the gray dead
14 softwood areas indicating that the budworm has
15 defoliated this to the point where the trees are dead.
16 That would be another major external factor which,
17 again, gives rise, as do the previous two, to
18 essentially even-aged stands because they are a very
19 major factor comes in and revegetation in a sense
20 starts essentially all over again.

21 Q. What sort of insect, in fact,
22 attacked that particular area in the photograph?

23 A. This was spruce budworm, and I will
24 be showing the Board a series of 20 years of
25 quantification of the spruce budworm in Ontario in

1 terms of areas of moderate to severe defoliation as a
2 sequence over time.

3 Again, I come back to the time frame
4 which is an important element by looking at both the
5 forest and the dynamics of that forest.

6 Q. Before you leave that, Mr. Armson.
7 Spruce budworm, does it attack -- I am assuming from
8 the name that it does attack spruce?

9 A. It attacks spruce, but it prefers
10 balsam fir. I suppose it should be called the balsam
11 fir budworm, but I guess that is too much of a
12 long-winded name.

13 It is very effective in devouring balsam
14 fir. It also chews on white spruce and black spruce to
15 a very limited degree. And again here is a point in
16 terms of the silvics of the species and I might just
17 mention.

18 In terms of black spruce, it is very
19 seldom that the black spruce is actually killed, there
20 really isn't enough defoliation, the insect doesn't
21 like black spruce needles. It does, however, devour
22 the cone, the flower cones as they are, of black spruce
23 and, although it may not be a major factor in mortality
24 in black spruce, where you have an infestation, it can,
25 in effect, take out cone crops over a series of many

1 years.

2 And the best example I can give you of
3 that is in the 1970s, in the area of the clay belt - I
4 referred to that earlier - we could not get a
5 reasonable crop of black spruce seed to carry on our
6 regeneration efforts because the budworm was, in fact,
7 removing those flowers before they could mature and
8 produce seed. So that's another element that gets into
9 it that we don't hear about usually.

10 The effect of these agents - and I guess
11 it may sound that I am harping on fire, but I would
12 like the Board to realize that in the area of the
13 undertaking, the natural forest, the ones that we have
14 entered into, I think I would be not far off in saying
15 at least two thirds, three quarters, maybe even 80 per
16 cent of that, even including the Algonquian region with
17 its maple stands, those areas have within the last 150
18 to 200 years, most of them, have been burny by fire.
19 And the evidence is always there in the charcoal in the
20 forest floor layer or just on the surface of the
21 mineral soil.

22 An area that has been burnt, and this is
23 the aftermath of the Red Lake fire in 1986 --

24 Q. That's Document 60 at page 54?

25 A. We have used it to illustrate two

1 points: That in looking at it - and this was taken by
2 one of the photographers of the Ministry, so he had no
3 reason to suspect we were going to use it here - it is
4 a pretty desolate looking place.

5 There is a lightish tinge to everything,
6 and basically that's from the ash. This is very
7 shortly after the fire, and the standing stems are the
8 shicos that I have referred to and, ultimately, they
9 are the ones that blow over and create that cultivation
10 effect. So they are a very desolate looking spot in
11 terms of immediately following the fire.

12 However, as you will also see, these
13 areas we do revegetate, in an area of mature timber,
14 that will come back to essentially the jack pine and
15 spruce that were there, and really the forest land
16 base - in going back to that portrayal of the soil - is
17 a very resilient one; it is one in which there have
18 been over 10,000, 11,000 years there have been fires
19 and tornados, and fires and tornados, all kinds of
20 things, yet that material is still there.

21 The illustration we have here is of an
22 area in Sioux Lookout district. I took this some years
23 ago, in 1968, when I was actually doing the study I
24 referred to on the effects of fire on soil in an area
25 that was not subject to harvest, and you will see two

1 areas there.

2 Just to illustrate, the boundary between
3 the two fires, the earlier fire - this one which was in
4 1950, I believe - and the one to the left, a little
5 patch of it in there, which was in 1961.

6 Q. So for the purpose of the record, in
7 this photograph, the area which was burnt in 19 --
8 pardon me, 1950 is the area which appears green on the
9 right-hand side of the picture or the slide, and the
10 1961 fire is on the left and is a different colour,
11 sort of a grayey green or something?

12 A. I would just draw to the Board's
13 attention that there is a pocket of larger timber in
14 here that obviously was not burnt in that earlier fire,
15 and you will see over here in the area of the more
16 recent fire, the 1961, there are strands of timber
17 usually along either gullies or waterways where the
18 fire skipped.

19 So one of the characteristics, we talk
20 about that as an even-aged stand, but within that there
21 is variety and diversity both in terms of patches or
22 blocks or strands of existing timber that have been
23 left which will eventually mature, fall over, die and
24 be eaten by insects or one thing or another, but
25 essentially, we would treat that as one age class.

.

1 So I don't want the Board to say that
2 when we say even-age, we are not talking about exactly
3 the year or anything, but that is an age class in our
4 terminology.

5 Q. Is this an area -- had there been any
6 logging operations in this area?

7 A. No, this never had been logged. In
8 fact, there is no access except by air or by canoe to
9 this area.

10 Q. And what was the predominant species
11 in this area?

12 A. The predominant species here were
13 jack pine, black spruce and trembling aspen.

14 Q. All right. And through what method
15 did that area regenerate?

16 A. Well, it regenerated by fire and had
17 been regenerated by fire as long as we know in the
18 past.

19 Q. Thank you.

20 A. If I might, I want to go to that
21 slide right now. If we might have the lights on, I
22 would like to move to the LANDSAT imagery on the board.

23 MR. FREIDIN: I think the document that
24 we were just referring to was Document 60 at page 55.

25 The two LANDSAT photographs that Mr.

1 Armson is going to refer to are marked Document 6(f)
2 and 6(g) of page 56 and 57 respectively.

3 THE CHAIRMAN: Can we mark these perhaps
4 on the back of those as exhibits?

5 MR. FREIDIN: Sure.

6 THE CHAIRMAN: Exhibit 57A on the left
7 and 57B on the right, please.

8 MR. FREIDIN: I was just wondering
9 whether we could do it the other way around? We will
10 have them correspond to the...

11 THE CHAIRMAN: Very well. Switch them
12 around. The other one will be 57A, the one on the
13 right; the one on the left will be 57B.

14 ---EXHIBIT NO. 57A: LANDSAT imagery of northwest
15 corner on scale of 1 to 1,000,000
-Document 6(f).

16 ---EXHIBIT NO. 57B: LANDSAT imagery of northwest
17 corner on scale of 1 to 500,000
-Document 6(g).

18 THE WITNESS: This is an area, and I will
19 refer to the general map showing the area of the
20 undertaking. We are looking at images for this area in
21 here, that's in Red Lake District and in essentially
22 the northwest corner of the area of the undertaking.

23 There are two reasons perhaps for showing
24 this particular area: It is an area for which the full
25 LANDSAT imagery was available, we have some

1 documentation --

2 MR. MARTEL: Excuse me.

3 THE WITNESS: Yes, Mr. Martel?

4 MR. MARTEL: What is the second word you
5 are using, land...?

6 THE WITNESS: SAT, it is all one word.
7 L-A-N-D-S-A-T, and it is short for land satellite
8 imagery.

9 Really two reasons: This is an area for
10 which we had previous documentation, and I will refer
11 to that a little later, but it is also an area within
12 the undertaking where there are -- there happens to be
13 a frequency and an occurrence of fire that -- certain
14 features of fire, its occurrence, its magnitude and its
15 extent, aerially can be shown.

16 Just to position you. I said it was the
17 northwest corner. This particular imagery or picture
18 is at a scale of 1 to 1,000,000.

19 Roughly speaking, what we are looking at
20 then is an area just broadly in terms of something like
21 50 miles by 50 miles, just to give you some order of
22 magnitude.

23 MR. FREIDIN: Q. And you are referring
24 to Exhibit 57A?

25 A. The second image, which is 57B, is of

1 the same area but the scale has been larger. It has
2 been changed to 1 to 500,000.

3 So, in effect, what we are looking at
4 here is an area that, in this original one, is
5 something like -- it comes up that far and across here.
6 If you -- just for identification, that's the Town of
7 Red Lake in this map. (indicating)

8 Q. You have identified Red Lake, you
9 circled it in red?

10 A. I circled it in red on this map.
11 There is the Town of Red Lake on that map, and to give
12 you the other dimension, there is an area that is
13 labelled "Burnt in '76" in the Balmertown area that's
14 been identified as burnt in 1961, and there are the
15 same areas burned in 1976 and burned in 1961 there.

16 So this is what we would call a blow-up,
17 in effect, of this part of the map.

18 Q. 57B is of a blow-up of a portion of
19 57A.

20 A. The imagery was taken, the first one,
21 57A, was taken in July of 1987. The second one was
22 from the satellite, but it was taken a year earlier,
23 actually not very long after the Red Lake fire which I
24 showed you a picture of just a few minutes ago.

25 The staff of the Ontario Centre for

1 Remote Sensing were specialized in interpreting this
2 kind of imagery, because the colours don't respond --
3 don't reflect what we would normally think of.

4 If we look at this, the red colours in
5 here reflect vegetation and normally fairly thrifty,
6 young, this is not an over-mature stand. The darker
7 the colour in general, then the older, and the more
8 mature the vegetation, in this case we are dealing with
9 forest.

10 Where you see light colours, you are
11 looking at areas that have been depleted, cutovers and
12 we have some examples of those; these small
13 light-coloured areas that you see here and, in fact,
14 the road that traverses -- that shows up here as a thin
15 white line.

16 I don't know whether it is visible to the
17 Board at this distance, but that shows up then as a
18 very light colour.

19 Q. It might show up on the copy that the
20 Board has.

21 Mr. Armson, if you could try and remember
22 when you are referring to one document that you always
23 indicate which document you are referring to.

24 A. I will. Yes, sir.

25 There is another light colour in here on

1 57A - which I am informed by the interpreter - is a
2 light haze colour because -- that light colour, that's
3 to the mid-size and slightly to the right in 57A.

4 That has nothing to do with the actual
5 substance on the ground. That's haze in the air, in
6 the atmosphere. The other colours are essentially
7 reflecting conditions on the ground.

8 The Red Lake fire is identified on the
9 bottom of 57A and there is a number 86 in it, and you
10 will notice that that is an area - with the road going
11 through it, with some cutover - that is the area that
12 was burned most recently, the '86 fire. It also shows
13 up, to a much larger degree, in 57B as a major area.

14 The numbers on the imagery of both 57A and
15 57B are numbers that refer to the years of the fire,
16 the year in which a fire occurred.

17 So, you see, for example, 1961, which is
18 in the top middle range of 57A, that means that that
19 area was burnt in 1961. So the vegetation on it is in
20 fact or was in fact 26 years of age at that time that
21 the imagery occurred.

22 The first thing that comes out is the huge
23 areas that have been burned historically over the more
24 recent years. To the left of 57A, right in the middle,
25 is a very light-coloured area, and on the left margin -

1 this is light coloured, but it has some greenish and
2 pinkish cast to it, and the number 83 occurs in that.

3 That is an area that was burned, in other
4 words, in 1983, an area forest that was burnt, and the
5 greenish and pinkish cast reflects revegetation within
6 the four-year period since the fire.

7 To the right of that, immediately to the
8 right, is the area that was burned in 1974 initially,
9 and that is indicated by the number 74, but also the 83
10 fire swept through that area.

11 In other words, we had two adjacent
12 areas, one of standing forest, and the other of an
13 adjacent area that was burnt in 1974. So in 1987 it
14 was 13 years old, it would have been 13 years old,
15 but a fire that consumed that standing portion moved
16 into that young forest in 1983 when it was nine years
17 of age. This is from seed.

18 These would be, again, the predominant
19 vegetation, jack pine and black spruce. The species,
20 therefore, at that age would be something of this order
21 of height, they would be not be producing cones in any
22 prolific amount, the early stage of development.

23 So the reason that you see that area, 83,
24 burned, and this is 83, this in fact was an area of
25 revegetated and regenerated forest naturally which has

1 been burnt a second time and, therefore, it is an area
2 in which regeneration - not so much revegetation, many
3 small plants will come back - but regeneration of the
4 tree species is very much minimal and will be very
5 sporadic.

6 And this is one of the factors that we
7 have when we have natural fire where we have reburns,
8 especially within a decade or two of the first burn, we
9 are almost guaranteed -- sure, that that area that was
10 reburnt should be seeded.

11 In fact, in other words, here we can let
12 nature do its thing, over here, if we want that to
13 revegetate with the species we want, we have to get to
14 it.

15 Q. You indicated that the area to the
16 right which was burnt in the two different years, its
17 regrowth would be sporadic?

18 A. That's right.

19 Q. What would you predict, or are you
20 able to make any prediction as to what that area would
21 look like way down the road in the future?

22 A. This area in 20 years, in 40 years,
23 would be a very open stand, it would be almost a
24 park-like type of stand, branchy trees.

25 In terms of productivity, the actual

1 product of it would be very low, yet the area could
2 sustain a timber plan. This is where, as I say, we
3 would seed and one of the -- yes, Mr. Martel?

4 MR. MARTIN: Tell me something. What
5 causes -- do those colours come out naturally when you
6 are photographing them, or do you add something to it
7 to make the differentials show up more or...?

8 THE WITNESS: I cannot answer your
9 question exactly. I have asked our interpreters why do
10 these comes out, those colours that they do, and it's
11 related to the technical aspects of the remote sensing
12 imagery and the spectrum over which they scan and so
13 on.

14 I honestly can't tell you, Mr. Martel,
15 why the colours are exactly the way they are. They in
16 fact - I do know - use various filters and screens to
17 highlight certain kinds of things, so that if you are
18 interested in broad-leaf species versus conifer
19 species, you can in fact take that multi-spectral
20 imagery, which is the jargon for it, and you can
21 highlight the things you're interested in.

22 But, in this case, I understand the
23 Ontario Centre for Remote Sensing specifically
24 highlighted those elements in terms of colour that
25 would show up these age classes in the area of the

1 burn. But why it's red in one case...

2 Another point here, while we are talking
3 about fire -- I hate to dwell on fire, but I think it
4 is an important element. When we are in silvicultural
5 treatments regenerating areas with jack pine, the
6 knowledge of the importance of temperature and fire to
7 release that,

8 We obviously don't go around sort of
9 burning at will, but one of the things we may do is in
10 fact harvest jack pine in order to get a maximum spread
11 of cones from the trees, but not on the ground and on
12 mineral soil - we have referred to the mineral soil
13 here - because in the relatively warm summer
14 conditions, especially at this time of year, a jack
15 pine cone lying on a mineral surface can get very hot.

16 In fact, the temperature could reach the
17 point that the resin which seals that cone breaks open.
18 And when it does this, then the seeds are released and
19 when you look at regeneration from cones that are
20 scattered, either deliberately or just happenstance,
21 what you often find are clunks of jack pine seedlings.

22 Now, in harvesting, what we may do is in
23 fact harvest where we prescribe the generation from
24 cones from the existing stand, to harvest in the winter
25 when the tree is frozen, you are going to get a lot of

1 crown breakage, thick branches breaking off, and the
2 cones will scatter.

3 And if you then also have some additional
4 site preparation, it is usually -- prepares the mineral
5 soil, then you have got a condition that will almost
6 guarantee natural regeneration of jack pine.

7 MR. MARTEL: When do you do a control
8 burn then?

9 THE WITNESS: We do a control burn --
10 the best example I could give you of control burn is
11 where we have had spruce budworm in a productive area,
12 which balsam fir was the key species, and we have a
13 large amount of slash, we want to get rid of it so that
14 we can plant it to spruce, or conifer in some cases,
15 but let's say spruce, and then we would want to get
16 that area clean so that we could then plant much more
17 efficiently, because the slash really makes it
18 difficult for tree planting to get reasonable
19 distribution of the trees in that area.

20 The secondary benefit, that if we
21 prescribed burn - and here we are burning to reduce
22 that slash, not destroy the forest floor - then in fact
23 what we are doing is enhancing the fertility of that
24 soil, you know, just the way a natural fire does
25 because we are, in fact, making a lot of available

1 nutrients, particularly phosphorus, calcium and
2 potassium in that soil and that's the normal effects of
3 these fires.

4 MR. FREIDIN: Q. The area of cutovers,
5 or the areas which have been logged, are they shown on
6 either of these?

7 A. Yes, they are shown on both 57A in
8 the lower third of the map and more or less towards the
9 centre; they are associated with the road system.
10 These are cutovers that would have occurred within the
11 last 15 years in that area, and you will notice some of
12 them are lighter in colour than others.

13 In fact, the ones at the far end of where
14 the '86 burn has occurred, show quite a greenish-blue
15 colour which means it is well established.

16 If you look at 57B where those areas show
17 up in a larger dimension, you can again see almost, you
18 can tell some of the relative ages, the older cutovers
19 from the younger ones by the colouring or by the degree
20 of lightness or darkness of that area.

21 Q. Now, I understand that you have a
22 slide which demonstrates the history of fire in the
23 particular area which is referred to in 57A and 57B?

24 A. Yes, if we could have the lights off,
25 I would just like to show the Board one further slide

1 on fire and then I will leave fire, Mr. Chairman.

2 Maybe that's why the alarm bells were
3 going off, I don't know.

4 Q. And perhaps you should -- I think,
5 maybe I am incorrect, perhaps you should describe the
6 area at 58 -- the document at page 58 refers to and how
7 it relates to 57A and 57B.

8 A. Okay, I think I've got it with me.

9 I mentioned, and you are aware of, then,
10 the way in which current technology and imagery can be
11 used to identify those areas. Prior to the use of
12 satellite imagery, we had to use another method and
13 that was the old-fashioned one of documentation and
14 what people could see.

15 This is a map covering a much larger area
16 than the LANDSAT imagery, but the LANDSAT imagery is
17 essentially in this area, and this was a map that was
18 prepared from documents of the predecessor of the
19 Ministry, the Ontario Department of Lands & Forests, of
20 areas that had been burned by age classes. In this
21 case, they were done by five-year age classes, areas
22 that had been burnt and were known about.

23 And I merely put it in to show you that
24 the documentation of these areas, whether it be from
25 nowadays' modern technology or in the past, has

1 occurred and has identified, for example, there an area
2 of a double burn. You can see areas in here, in fact,
3 where three fires have gone through within certain
4 periods of time.

5 From that we can make certain, pretty
6 fair assumptions about the nature of the vegetation in
7 those areas and how it will develop. This happens to
8 be the area that I was working in in 1968 that I
9 mentioned earlier.

10 THE CHAIRMAN: Would it be fair to say
11 from that last slide that in the five-year periods, the
12 coverage of the fires across the province seem to be
13 relatively constant?

14 THE WITNESS: I don't think -- the
15 Aviation and Fire Management Centre keep track of both,
16 obviously, the location and the extent. And at one
17 time it appeared, up until a few years ago, as if we
18 were running on some kind of a seven-year cycle and as
19 soon as it was thought that that was the cycle we were
20 on and all the past evidence showed it, of course, you
21 can be sure of exactly what happened, we didn't go on
22 with seven-year cycles from there on.

23 So you will find some tremendous
24 variation from year to year, but past historical
25 records, over a period of time, it did look like there

1 was a -- I have forgotten if it was a seven or
2 thirteen-year cycle, but it's something of that order.

3 The third factor that I mentioned, and I
4 would like to illustrate in some detail, relates to an
5 insect pest that is very common, it is indigenous, it
6 is a native pest, it has been here as long as -- as far
7 as we know, ever since the forests have been here,
8 certainly for more than 200 years and there is no
9 reason to suspect that it isn't a native one.

10 And the Canadian Forestry Service, and
11 particularly the forest insect and disease survey of
12 the Canadian Forest Service, do annually a routine
13 survey of the major pests and identify where they are.
14 And what -- with their assistance, they have put
15 together the maps - these are actually maps they
16 normally produced - and they have provided us with a
17 sequence from 1967 to 1987, and what you will see here
18 is the shift in location and a change in the magnitude
19 of areas that are affected by these insects, not in
20 terms of the population of the insect itself, but in
21 terms of the areas of moderate to severe defoliation on
22 the host species. And that, as I mentioned earlier, is
23 balsam fir and white spruce and, to a very limited
24 degree, black spruce.

25 MR. FREIDIN: Q. Mr. Armson, these

1 particular diagrams that show up on pages 59 to 79 of
2 the witness statement, and perhaps if you are going to
3 be speaking about any one in particular you can
4 identify it by referring to the year--

5 A. Yes, I will do that.

6 Q. --on the diagram.

7 A. Right. In the diagram you will
8 notice that it is a map of the province showing the
9 eight administrative regions of the Ministry, and those
10 are identified in the top right-hand corner, and the
11 region boundaries are identified by fairly heavy lines,
12 and the numbers in the top right-hand corner correspond
13 to the numbers within each of those heavy lines.

14 The first one for 1967 indicates that
15 there was moderate to severe defoliation of the whole
16 species over an area of close to 80,000 hectares,
17 79.927-thousand hectares.

18 The areas, the locations of that area is
19 concentrated, for the most part, in a series of
20 outbreaks in stands in the eastern region and in the
21 north -- in the Algonquin region, essentially in the
22 Ottawa Valley area, they are quite low down, in fact,
23 essentially outside the area -- virtually outside the
24 area of the undertaking, mostly in the Ottawa Valley
25 would be outside of Crown land.

1 There are one or two isolated spots in
2 the central region, one north of Toronto and another
3 one just to the west of Lake Simcoe, the south of Lake
4 Simcoe. And you will notice two isolated areas, one up
5 here in the northern region and looping here in the
6 northcentral region west of Thunder Bay. (indicating)

7 I should point out to you that the last
8 part of this most recent outbreak, the last major
9 outbreak of spruce budworm in Ontario was finished off
10 somewhere in this general area, but this is in 1967.

11 In '68, the area in the Ottawa Valley
12 had -- these isolated outbreaks virtually merged.
13 There were a series of smaller outbreak areas, again,
14 in the south, but now in the northeastern region there
15 is a sequence, just north of Sudbury and along the
16 north shore, and a clustering up here centered around
17 the other one in the northern region and on the borders
18 of west -- or pardon me, east of Wawa towards the
19 Chapleau area, and still have these one or two outliers
20 in the northcentral. But the area that's been affected
21 has gone from 80,000 to 223,000. So there has been a
22 fourfold increase in one year.

23 Q. Now, if you could just sort of stop
24 there. Where it indicates the year, in addition to the
25 area it indicates moderate to severe defoliation. Any

1 significance as to whether the defoliation is moderate
2 or severe?

3 A. No. In their survey they have
4 combined those categories in these maps. A forest or a
5 tree that is affected by moderate defoliation, if there
6 were no further defoliation would recover, in all
7 likelihood, without any problem.

8 If it were severely defoliated, depending
9 on condition, age and so on, it is most likely that
10 even if it were not subject to another infestation or
11 feeding the next year, it would probably die and
12 succumb.

13 Q. So these figures are also indicated
14 for a particular year. So in this one '68, 323,755
15 hectares are identified.

16 MR. MARTEL: Could I ask a question?

17 THE WITNESS: Yes.

18 MR. FREIDIN: Sure.

19 MR. MARTIN: If a tree is affected badly
20 one year, if I understand it, come the second year,
21 providing that the infestation wasn't there, that in
22 fact it could survive even though...

23 THE WITNESS: That is correct, Mr.
24 Martel. It would be very unusual that you would get
25 such a severe defoliation in one year, and that is,

1 from a -- that it would be so badly defoliated that it
2 wouldn't be able to recover. It might not grow as well
3 the next year, but given the one year's infestation,
4 no.

5 It is the sequence that really does the
6 tree in, it is not the single feeding, but it is the
7 recurring.

8 Keeping in mind, you see, that the
9 species we are talking about, balsam fir and white
10 spruce, in particular, and also black spruce - but, as
11 I say, they don't like it - they retain their foliage
12 for seven or eight years. Now, depending upon the
13 vigor of the tree, a tree that is a conifer, such as
14 balsam fir or white spruce, if it is already in a low
15 vigor state it will not carry that amount of year's
16 foliage. In fact, one of the earliest symptoms of
17 problems in a tree is shortening of the growth at the
18 top of the tree and a reduction in the number of
19 needles it carries, so that the crown becomes more
20 open.

21 Now, if a tree that is in some stage of
22 carrying four years' foliage instead of six or seven
23 years' foliage, is defoliated, that has a much greater
24 impact on the tree's ability to photosynthesize, to
25 make food, to do its things, to grow and sustain its

1 growth then if it is carrying more foliage.

2 It is like -- I guess like a factory. If
3 you reduce the capacity of the machinery in there to
4 produce, you are in fact then making that particular
5 production plant more susceptible. And this is a
6 general biological principle.

7 But, yes, it would not die with one
8 infestation, but depending on the status and vigor of
9 the tree that is another factor.

10 MR. FREIDIN: Q. Perhaps then while we
11 are on that point, if I give you a hypothetical, Mr.
12 Armson - just to understand how these reports of
13 infestation are kept - if area "x" was defoliated in
14 1967 and in 1968 additional defoliation occurred in the
15 same area, in area "x", would the defoliation in that
16 second year show up in that total figure that we have
17 on the 1968 map?

18 A. It would be included. For example,
19 within an area here that is cross-hatched, yes, it
20 would be included, it would be accumulated within that
21 number.

22 Q. And if it was an area which was
23 defoliated in 1967 but wasn't the subject of a repeat
24 defoliation in '68, would that area be excluded?

25 A. It would normally be excluded. It

1 would be -- I think as you will see here, once the
2 population, particularly budworm, begins to roll, unless
3 there some certain factors come into play, it basically
4 moves very quickly and expands very rapidly.

5 For example, one year later - and this is
6 nearly two years then from the time of initiation - we
7 have a major area in the west side of the northern
8 region, the south part of the boundary between the
9 northern and northeastern region, and the Ottawa
10 outbreak is still there, it hasn't expanded and the
11 reason most probably for that lack of expansion is the
12 host species are not really that prevalent in large
13 stands. So it is contained in fact -- limited by the
14 food source, if you will.

15 Up here, however, we have a very wide
16 area of susceptible species, of host species. So here
17 we have reached virtually 1-million or 980,000 in the
18 space of just over two years.

19 Q. How does this infestation spread, Mr.
20 Armson?

21 A. The infestation spreads by moths.
22 The spruce budworm is essentially a moth, but the worm,
23 the larvae does not cause the damage, but when it
24 pupates, the moth is the agency whereby eggs are
25 distributed and, of course, many - I would say,

1 millions of moths are produced in this kind of an
2 infestation.

3 They are small moths and, in fact, they
4 can be readily blown around by prevailing winds and it
5 is not unusual, for example, to have infestations that
6 are moved often to areas that normally don't have them.

7 The best example I can give you is the
8 spruce budworm outbreak in Newfoundland where they have
9 never traditionally had spruce budworm but the
10 prevailing winds took it from the Cape Breton Highlands
11 where they had a major infestation and blew it right
12 across.

13 Some years ago, in the early 70s,
14 Toronto -- a lot of people in Toronto wondered why
15 their white spruce were all being defoliated and they
16 were actually in the late 70s -- in 60s rather, they
17 were being defoliated from moth flights that had been
18 blown down from the Ottawa Valley.

19 In 1970, we are talking about 2.8-million
20 acres of infestation. And, again, you see that the
21 infestations have developed, again, now starting to
22 move into the Algonquin region, and here in these two
23 regions it is getting larger. The infestations out in
24 here have not developed, and it raises the question -
25 and there isn't a simple answer - as to why did those

1 infestations in the more central part of the province
2 develop than these in northwestern Ontario didn't at
3 this time.

4 And if I may, Mr. Chairman, we will look
5 at what happened in northwestern Ontario shortly.

6 So in '71, we now begin to see that there
7 are more outbreaks in northwestern Ontario. These are
8 becoming major areas, and over 5-million hectares that
9 are, of forests of the host species, that are
10 moderate -- suffering moderate to severe defoliation.

11 '72, nearly 8-million hectares and
12 essentially a large part of the southern half of the
13 northern region is totally taken in by that
14 infestation.

15 The Ottawa outbreak now has expanded well
16 into Algonquin Park and there were -- this was a period
17 during the 70s - I can recall driving through the park
18 and many of the tourists stopped and wondered what was
19 happening to their balsam fir -- which there occurred,
20 was another story an isolated area.

21 In fact, the park staff put out signs
22 along the nature trails saying: This is a result of
23 spruce budworm, and it became in fact something of a
24 site to see and what happens when it occurs.

25 In '73, 7.5-million hectares and you will

1 notice that the outbreak here in the northwest has gone
2 down. In the previous year -- whoops, I think two
3 years, there was in fact a larger set of areas. So in
4 fact it has diminished, it didn't expand.

5 And this illustrates one of the, if you
6 like, problems that we have. We can predict that once
7 we get an infestation, the likelihood is that it will
8 develop, but then there are circumstances where we
9 would expect it to develop and it doesn't, it
10 contracts, and the most probable reason is that weather
11 conditions in there, because we know that wasn't -- in
12 this particular case, that wasn't affected by any
13 control measure. But the most probable effect in there
14 was due to weather conditions that affected the ability
15 of the larvae to chew early in the spring, probably
16 warm weather, it came out started eating, and very cold
17 weather, frost drove them and that in fact acts as a
18 control.

19 But it is still there, and as you will
20 see in the next few slides, while this outbreak is a
21 major one - and this is still minimal into the
22 mid-70s - and you can see now the dimension that it has
23 taken on.

24 And you were asking me, Mr. Martel, about
25 areas of slash and so on. We were talking about -- I

1 used the example of prescribed burning of balsam fir
2 stands that had been killed by budworm, and this is the
3 type of thing that went on in some of these areas.

4 Now, you are going to see -- perhaps
5 let's go back to the last slide. You notice here that
6 in the northwest there is an area that is starting to
7 develop west of Thunder Bay. The outbreak over here is
8 still there, but now we have got, in this area, an area
9 starting to coalesce. It sat there and developed a
10 little bit, contracted, and then it's now developing
11 further. And you now begin to see...

12 This one is still major. The Ottawa
13 Valley one is now a series of remnants in stands - the
14 large area is gone - and now we are beginning to see
15 the development of the budworm, in this case, ten years
16 after the initial one and it is starting to work into
17 northwestern Ontario.

18 And now we are up to an area of
19 14-million hectares, and you can put that in the
20 context of the 200,000 hectares provincially that are
21 harvested or the order of magnitude of fire which may
22 range from a few hundred to several hundred thousand
23 hectares annually.

24 Q. And, again, that is the defoliation
25 that took place just in 1977?

1 A. This is the areas of moderate to
2 severe defoliation totally.

3 MRS. KOVEN: Excuse me, Mr. Armson--

4 THE WITNESS: Yes.

5 MRS. KOVEN: --is it mature trees that
6 budworm...

7 THE WITNESS: Well, if they are just
8 defoliated. The problem is that as they -- in the
9 second year of defoliation they become very susceptible
10 to other decays, and this is the real problem with
11 balsam fir. Once the budworm enters the stand, you
12 really have to harvest it very quickly or the budworm
13 will harvest it before you do.

14 We talked about fire harvesting timber,
15 insect and that is the problem. So it means that in
16 many areas, unless you can control the population so
17 that you maintain - and this will be dealt with later
18 on in terms of control measures - but what you are
19 really trying to do in a control situation is not
20 eradicate the budworm, but ensure that the trees that
21 are there maintain enough live foliage to keep them
22 living and ahead of the budworm and ahead of decay.

23 So that really is the nub of the issue
24 and that is on a very -- if it becomes a very extensive
25 area, then you have a real problem obviously in

1 attempting anything virtually to salvage.

2 I think, Mr. Martel, you were really
3 leading up to a question - at least I take it - how
4 much time do you have to get in and harvest this timber
5 essentially if "you are looking at salvaging it before
6 the budworm".

7 MR. MARTEL: Yes, because people say that
8 one of the ways to combat that is to accelerate the
9 salvage.

10 THE WITNESS: That's right.

11 MR. MARTEL: There are some differences
12 of opinion on how you treat it.

13 THE WITNESS: Well, one of the things is
14 that if you have a small amount to salvage it is
15 digestible - remember we are dealing with a species
16 here, in terms of balsam fir - yes, can be used but how
17 much can be used at any one time, and once the outbreak
18 reaches that kind of a dimension, you are talking
19 about, I would say, industrial indigestion in terms of
20 attempting to use the wood that is out there.

21 THE CHAIRMAN: Mr. Armson?

22 THE WITNESS: Yes.

23 THE CHAIRMAN: If areas are defoliated
24 and the balsam is severely damaged in terms of the
25 quantity that is available for harvesting--

1 THE WITNESS: Yes.

2 THE CHAIRMAN: --if nothing is done, will
3 it be replaced by other species?

4 THE WITNESS: In some cases, but often it
5 will come back to balsam fir.

6 The spruce budworm, in fact, hasn't been
7 a factor in regenerating balsam fir. The larger stands
8 of balsam fir that are killed, throw out seeds, there
9 are seed crops that come out during the process of
10 defoliation. In other words, they obviously don't
11 regenerate when they are dead.

12 And, in fact, what you often then have is
13 a new young stand of balsam fir and the budworm is
14 passed on, so it doesn't eat up the new regeneration,
15 but it is not uncommon to see that the budworm will, in
16 fact, be associated with a sequence of balsam fir.

17 THE CHAIRMAN: So this isn't really
18 nature's way of changing the species, so to speak?

19 THE WITNESS: No, I wouldn't look at it
20 that way at all. There may be instances where, for
21 whatever reason, another species does invade, but
22 normally that isn't the case.

23 Well, I don't want to sort of prolong
24 this, but I think what we are looking at then in this
25 process is from what 70,000 or 80,000 odd hectares, in

1 11 years we have got 15-million, we are now 18-million
2 in 12 years, and we are again looking at an interesting
3 pattern in which it is extending right throughout that
4 central and northern part of the province, because
5 there is a sort of -- I guess I would call it a holding
6 pattern going on here in the northwest. It is there,
7 and something seems to be containing it, and it
8 certainly isn't us in terms of any control measures.

9 By 1980, we are into nearly 19-million
10 hectares, almost a tenth of the total area that might
11 be harvested. And now we begin to see some changes in
12 the early 80s taking place with the total area is not
13 becoming any larger, but watch, there is some
14 diminution in this central area and you will note some
15 expansion, and you will see on the area southwest of
16 Lake Nipigon - see Lake Nipigon here in the centre or
17 top left side of the map - and you will see this area
18 starting up in here. (indicating)

19 And we see a very dramatic reduction in
20 terms of the area of severe -- of moderate to severe
21 defoliation. In fact, the balsam fir is dead; there is
22 nothing more to chew on. And what we now see is a
23 major development occurring now in the northwest.

24 So while this is being reduced in area,
25 the trees have been lost in effect, for the most part,

1 then this infestation by '82 is -- the infestation is
2 way down, but it is 8.79-million hectares, and now you
3 see what is developing in here is this pattern, and the
4 area southwest of Lake Nipigon is becoming larger, this
5 is an area to the Black Sturgeon which was a major area
6 of infestation in 1946, '47 up to '50.

7 So we often talk about it as running in
8 cycles of something of the order of 30, 40 -- 30 years,
9 40 years. But it has come back to an area, major
10 infestation in an area, that was -- in fact the balsam
11 fir was killed by budworm back in the mid-40s.

12 And by '84 we have not only the
13 infestation the major one north -- the southeast part
14 of the northwestern region, this whole area in
15 northcentral region, and you will see the residual part
16 over here in this part of the northcentral and the
17 northeastern region, and the others are merely outliers
18 with a small blob down here in the Temagami and
19 Timiskaming area.

20 And there you have it in '85. We are
21 back up now to 12-million hectares and virtually all
22 the major areas have gone from this part of the
23 province, and we now have this area up in here which is
24 a major area of defoliation. (indicating)

25 . '86, and the final one for last year,

1 '87, and you will notice that that represents a
2 diminution from almost 9-million hectares in '86, and
3 then in '87 last year it is down by a million hectares,
4 and it is likely that then that will reduce again and
5 we have got virtually no budworm over here, except for,
6 you see a little spot in here, a light spot, where are
7 we -- I guess two spots there, nothing showing up in
8 there. (indicating)

9 So that is essentially the picture of the
10 movement of a major pest through the forests of the
11 undertaking, how it has changed and with - apart from a
12 three-year period when there were, three to four-year
13 period - when there was made some use of a pesticide of
14 bacillus thuringensis that, for the most part, was an
15 area that was not controlled. So there were many, many
16 probably millions of cubic metres of wood that was
17 harvested by the budworm.

18 Q. Did you just use a technical term, I
19 couldn't hear you very well?

20 A. Oh. I referred to a material that is
21 used to control the budworm called -- it is commonly
22 called BT, but it is bacillus t-h-u-r-i-n-g-e-n-s-i-s,
23 thuringensis - how is that, pesticide.

24 Q. And I understand, Mr. Armson, that
25 the use of insecticides, their purpose, their potential

1 effects will be the subject of a separate panel?

2 A. Yes, it will be.

3 Q. As well as there will be separate
4 panel that will be dealing with the planning for
5 protection operations?

6 A. That's correct.

7 Now, one of the -- if I may leave the
8 projector on and try to go to that.

9 One of the features then of all these
10 factors, the external factors in particular, is that
11 they create areas of regeneration in new forests that,
12 as I say, are relatively even-aged.

13 Earlier this morning when we were looking
14 at the forest resources of Ontario in the book, we were
15 looking at ways in which we quantify the forest, and
16 you will notice that we have used working group and
17 aggregation of stand. We then identified it or
18 quantified it by area, and we had quantified it by
19 volume, and we used the word growing stock in relation
20 to volume.

21 Now, as we did for the fires here where
22 we identified the year of the fire, therefore, we could
23 say this was an age class of a certain type. What we
24 do then in the quantification is break down the working
25 group and divide it up into areas according to age

1 class.

2 Now, you will appreciate that the natural
3 factors of fire and, particularly of fire and insects -
4 not so much wind - but they tend to give rise to very
5 large areas of a relatively uniform age class.

6 What this means is that when we bring
7 management to an area, a large area, the age class
8 distribution may be one that isn't immediately very
9 well adapted to a uniform or even flow of production
10 from that forest area and, by way of illustration, in
11 the forest resources book -- and Mr. Freidin if you
12 have the right...

13 Q. Exhibit 56.

14 A. Exhibit 56. There are two figures or
15 graphs which I have put on the screen in the form of a
16 slide.

17 The first one is for the spruce working
18 group for Ontario. So this is overall, but as you
19 noted, it is in the northern regions and, in fact, in
20 the area of the undertaking, particularly, that the
21 spruce working group predominates and it is the
22 largest.

23 And what has been done here is that the
24 growing stock, the areas of the working group, have
25 been segregated into age classes and, in this case, by

1 20-year age classes, just a convenience, and that could
2 be sub-divided further. So that -- and this has been
3 done in terms of the area measured in hectares.

4 So we have on the left-hand scale of the
5 picture one, two, three and four million hectares, and
6 we have the amount of that area by age in these various
7 age classes. And you will notice this one is 121+,
8 that means it may be a little older but it is at least
9 121 years of age.

10 And you will notice that in this figure
11 there is - and I will come back to this block here
12 labeled B & S, it sounds like a department store but it
13 isn't - this age class, 1 to 20 is the smallest and
14 then there is a progression and we move right up and,
15 in fact, the largest amount of the growing stock of the
16 area is in 100+. In fact, if you add these two columns
17 together you get more than 4-million hectares.

18 Now, if we were talking about a forest
19 that was, in terms of management that we would like,
20 the ideal forest, what we would like is a series of
21 histograms right across there all of the same extent.
22 So that, in fact, for each age class we would have
23 essentially the same area. So that in terms of
24 harvesting we can put it on to "a nice neat tidy
25 rotation."

1 And that is, in the forester's parlance,
2 that ideal condition is what we term the normal forest.
3 The problem is that there is a lot of jargon, it is the
4 one thing that is abnormal. The normal forest is an
5 exception, it is not the rule.

6 But in hypothesizing conceptually in
7 looking at forests and bringing them under management,
8 we use that ideal condition as a kind of a benchmark
9 and we say: All right, if we have this kind of a
10 forest - and this would apply -- this applies to the
11 Ontario scene, but in fact within a given management
12 unit, within a given region, this type of imbalance or
13 abnormal age class distribution is the rule.

14 There are a few units where - by virtue
15 of nature, not so much our effort - we do have
16 something that approaches the normal distribution.

17 This is for the spruce working group, and
18 I mentioned to you that somewhere in 80 to 100 years is
19 the normal rotation age, so we have this over-mature --
20 large area of over-mature timber here to deal with.

21 The same --

22 MRS. KOVEN: Sorry, where did you get
23 that data, Mr. Armson?

24 THE DEPONENT: This is from the inventory
25 data in the booklet and is merely taking the

1 quantification -- the numbers and putting it into a
2 graphical format.

3 MRS. KOVEN: The numbers that you started
4 with, did you get that from the districts?

5 THE WITNESS: From the inventory of the
6 province, and you will be hearing all about how the
7 numbers are gathered, the process, in Panel 3, the next
8 panel coming up with Dr. Osborne.

9 MR. FREIDIN: Just before we leave it,
10 that particular document is also page 80 of the witness
11 statement.

12 MR. MARTEL: Can you tell me, is that the
13 area you are concentrating on, or is that too
14 simplistic that you are trying to cut that out now, the
15 area with the 121+?

16 THE WITNESS: Okay. It is an area of --
17 it is an area that we have concern about because in
18 fact the growth curve through here is going down, we
19 are losing wood.

20 I mentioned earlier, Mr. Martel, about
21 storing wood. If, in a management unit, we had
22 material of that age class, that material, we would
23 like to store it on the lower quality sites, in other
24 words, and concentrate on the better sites in this age
25 class.

1 See, we are kind of caught here. If
2 we -- we have a large amount of the growing stock which
3 is, in this case, in general terms, going downhill in
4 terms of growth; some is going downhill rapidly and
5 some is gradually going down.

6 So if we harvest only the oldest first,
7 in this case, if we say that's an absolute, then we are
8 going to be into, in fact, some wood that is going to
9 be low production, low quality, in fact decadent; it is
10 going to be very poor material.

11 Whereas, if we were to forget about that
12 and come back to some of this material in here, forego
13 that, and try and store some of this and some of the
14 poorer quality, we may get a balance; it is a
15 compromise, there is no simple solution.

16 It is probably one of the most serious
17 things we have to deal with, because one of the
18 features in relation to this is access; if you have
19 areas of this kind of timber and you can't get access
20 to it, then you can't -- especially if it's areas that
21 could be storable for a decade or more, then you have a
22 problem. So access into these areas becomes a very key
23 issue, and that is road access I am speaking of.

24 This kind of a distribution, as I said, is
25 more the -- more common. In jack pine, the

1 distribution is somewhat different, but you will see
2 there is a big peak in this 40 to 60 year old age
3 class.

4 I mentioned the histogram at the left, the
5 B & S. In our inventory we use the term barren and
6 scattered to identify those areas which may have been
7 depleted by fire, depleted by insect or harvested in
8 which, at the time that the inventory is taken by
9 the -- and we are using aerial photograph again - there
10 is no visible stand that meets the criteria to put it
11 back into the inventory in the 1 to 20 age class.

12 In other words, it may be new
13 regeneration that is hithered yond scattered, that's
14 where the word scattered comes from. Or it may be an
15 area that has been recently depleted in which there
16 isn't any visible, particularly in the photo imagery,
17 that you can see it. So the photo interpreter will
18 class it as barren and scattered.

19 This doesn't mean that it remains barren
20 and scattered, and I think this is the point. In fact,
21 what we find is there is a recycling, if you like. The
22 areas that are barren and scattered in 1980, they are
23 rephotographed in 1990, we have a stand in most
24 instances of some kind, I don't say all.

25 So what that is is something like an area

1 of land within the working group that hasn't yet met
2 the criteria for coming back into the inventory.

3 So the term barren and scattered is
4 perhaps a little bit, especially the barren part, a
5 little bit of a misnomer, however that's...

6 Q. I understand Dr. Osborne in the next
7 panel will be describing this concept of a normal
8 forest in more detail, as well as dealing with how in
9 fact things get into the inventory and what the
10 significance for timber management is of areas being in
11 or out of the inventory; is that correct?

12 A. That is correct. You may have
13 noticed that the difference in, not only the shape of
14 the curve, but also in the fact that in this species
15 the 100 to 121 and up age class areas are much smaller
16 as compared with the spruce, and there are any number
17 of possibilities. It could be just that there were in
18 fact -- that was the way it happened.

19 But in all likelihood, as I have
20 indicated to you, jack pine is associated usually with
21 the better tree soils, the areas in which fire is more
22 recurring, has a greater frequency of recurrence as
23 compared to spruce and, in all likelihood, that in
24 terms of the provincial information reflects that kind
25 of a factor impacting on it, but it still presents a

1 problem.

2 What we have do it in management - we
3 have talked about some elements - is in order to move
4 towards the better distribution of age class, we have a
5 number of possibilities and they come to one that Mr.
6 Martel mentioned.

7 We can take the younger age classes and
8 attempt to increase -- we can't increase the area
9 particularly, but what we can is attempt to increase
10 the growth on those areas so that increased growth on
11 that area will make up for the lower area; we come in
12 to a balance between area and growth.

13 If we can grow more on the smaller areas
14 by pre-commercial thinning or some other form of
15 silvicultural treatment, then you can hoist it or we
16 can -- as I indicated, we can say: Well, what we have
17 do. We are going to have a problem in here. so what we
18 will do -- and this is what the Swedes did in the 60s,
19 they said: Well, what we will do is try and extend
20 some of these older age classes, they normally wouldn't
21 be with us, but what we will do is we will give them
22 something to make them think they are a little younger.

23 And one of the largest fertilization
24 projects or a series of projects that have ever been
25 undertaken were undertaken in Sweden in the 60s and

1 into the 70s merely to prolong those older age classes
2 and hold them because they didn't have enough coming on
3 here.

4 It is sort of a geriatric treatment, if
5 you like, to over mature trees. And that is one way.
6 So you extend it that way where you accelerate the
7 younger growth, and that's one of the key ways. We, of
8 course, haven't been involved in that as yet to any
9 degree.

10 Q. Mr. Armson, at the bottom of both of
11 these age class histograms there is a reference to a
12 rotation year at the bottom?

13 A. Yes.

14 Q. In this case of jack pine, it is 45
15 to 70 year rotation. What does that mean and what's
16 the significance of it?

17 A. The significance of that is that --
18 these are the two age classes normally in terms of the
19 management of jack pine. This is where we would
20 normally like to harvest and then return regenerate.

21 As I say, this is our problem up in here.
22 In the spruce, you will notice it was something of the
23 order of 75 to 100. The 100+ again indicating that on
24 some sites you can maintain a spruce, not vigorous in
25 the sense of fast-growing, but healthy in the sense of

1 not subject to decay or disease on those poorer sites.

2 Q. Would the phrase "over mature" apply
3 to that particular diagram that you had, the one back?

4 A. Yes. 121+, yes. And similarly with
5 the jack pine, it would apply to this age class in
6 here.

7 Q. Mr. Armson, you indicated that there
8 was an imbalance caused by some of these natural agents
9 of change, and I am wondering whether you could advise
10 whether that imbalance, in terms of the age class
11 distribution, is more predominant in one forest region
12 as opposed to another?

13 A. It is most predominant in the boreal
14 forest region for the reasons I think I have already
15 mentioned to the Board.

16 It does occur in the Great Lakes-Saint
17 Lawrence region. It is not certainly as evident
18 because, first of all, the tolerant species there, the
19 hard maple, for example, because they are tolerant they
20 tend to grow in a way in which you have an understory
21 and then it comes through and replaces it, and fire of
22 course is not as prevalent in that area.

23 So it doesn't -- but over maturity is
24 still a problem in that area too and, in fact, bringing
25 those forests, by a different form of treatment, back

1 into a more vigorous condition is important.

2 I think, in very simplistic terms, if we
3 look at the growing stock of the forest as essentially
4 a series of investments, we know that the younger -
5 whoops, sorry, go back here - the younger age classes,
6 whatever their area, are small and therefore the
7 absolute growth is minimal, but they grow at a fast
8 rate, they are like young people. As they mature, as
9 they grow older, they get larger, but their rate of
10 growth is slower.

11 One of the things we are concerned about
12 in timber management is in that curve of growth, we
13 want to ensure that we are not only getting the
14 material for the product but if we are managing it, we
15 want to, in fact, get a situation where we are getting
16 the maximum rate of growth.

17 It is like a series of investments. If
18 you had a lot of investments and the bulk of them were
19 earning two or three per cent - the Government of
20 Canada bonds from 1940, or something like that, you may
21 have a lot of money in it, but you wouldn't in fact be
22 increasing at any rate of growth. And what you would
23 probably be wanting to do is recycle that back into
24 higher returning rates of interest; that is, put it
25 back into underage classes.

1 And that is really the issue that we have
2 here in terms of dealing with a forest as a capital
3 growing stock, in that sense, and bringing a lot of the
4 older stands back into a more vigorous production by
5 removing them and, in fact, reinvesting in a new
6 forest.

7 Q. Mr. Armson, I just have one
8 question -- I think you can turn off the machine.

9 MR. FREIDIN: I just have one short
10 series of questions, Mr. Chairman, before we get into
11 the next aspect of Mr. Armson's evidence, so...

12 THE CHAIRMAN: All right. Perhaps after
13 you finish this series then, we will take a break for
14 mid-afternoon.

15 MR. FREIDIN: Q. My question goes back
16 to your evidence, Mr. Armson, about external and
17 internal agents of change. .

18 Could you advise, is there any connection
19 or correlation between external and internal agents of
20 change?

21 A. Yes, there is in many instances. For
22 example, and again I would come back to the description
23 of forest and the trees within it as living organs. As
24 they in fact mature, they become normally more
25 susceptible to certain agents of change; the best

1 example perhaps would be fire.

2 If an area -- there is an area of young
3 forest, vigorous growth, it is generally less
4 susceptible, for example, to lightening strikes; it
5 doesn't have the, if you like, the tall trees in it to
6 attract lightening and, in this sense, certain kinds of
7 forest, young forests, are less susceptible in that
8 sense; whereas an old forest with tall trees in it in
9 fact becomes more susceptible. This is one of the
10 areas, and probably the best one I can give.

11 Secondly, though, as a forest matures, and
12 this would perhaps apply particularly to the hardwood
13 species, as they become old, as they begin to have
14 demands which are greater than the soil particularly
15 can provide in terms of water, become stressful - and
16 probably one of the best examples of that, though it is
17 still not clear as to the cause in a very detailed
18 way - is the birch dieback which has occurred and it
19 also affects young trees, but one of the observations
20 is that it tends to be much more prevalent in the
21 larger, mature, and over-mature yellow birch, and
22 particularly those in soils which have a problem in
23 moisture supply. They then become susceptible to
24 diseases of various kinds.

25 Q. Is there any connection between the

1 diseases that you indicated before, the infestations
2 that you referred to before?

3 A. The spruce budworm, I don't think --
4 and a number of insect pests, spruce budworm, with the
5 forest tent caterpillar, it is not particularly related
6 to the vigor of the individual host plant, as far as
7 anybody can tell at this stage anyway.

8 MR. FREIDIN: Good time for a break.

9 THE CHAIRMAN: Very well. Ladies and
10 gentlemen, we are going to break for 20 minutes.

11 On the table over here, I have asked the
12 court reporter to provide copies of the transcript from
13 yesterday's proceeding dealing with the Board's
14 proposal to deal with evidence-in-chief.

15 It has the complete discussion that the
16 Board entered into with counsel and you might pick up a
17 copy of that so that you will be able to refer to it
18 when we deal with this matter on Thursday morning.

19 Thank you.

20 ---Recess at 3:30 p.m.

21 ---Upon resuming at 4:00 p.m.

22 THE CHAIRMAN: Thank you, ladies and
23 gentlemen. Please be seated.

24 MR. FREIDIN: Q. Mr. Armson, we have now
25 got to the point of the witness statement, paragraph

1 17. So we have gone through the natural internal and
2 external agents of change, and the balance of your
3 witness statement describes the development of timber
4 management in Ontario.

5 Perhaps you could just sort of pick up on
6 that particular topic indicating where, in fact, you
7 are going to start and how far you are going to take
8 the Board.

9 A. Well, what I would like to do is,
10 again, use the slides as an illustration of the
11 material, and just mention that at the start of this
12 presentation I indicated there were basically four
13 major areas in terms of the forest, the factors
14 affecting the forest and the dynamics, and these are
15 what we have dealt with.

16 I think perhaps -- if that's the base out
17 there, perhaps one of the more interesting areas, both
18 from a historical standpoint and also an understanding,
19 again, conceptually how we have arrived at the present,
20 is to look at some of the historical development.

21 So if we could have the lights off I will
22 turn the projector on. I rely on Mr. Freidin to keep
23 track of the particular documents. As I say, all these
24 slides are, in fact, documents that are presented in
25 the evidence package.

1 Q. So perhaps when you put the slide on
2 you will give me a chance to indicate the page for the
3 record, Mr. Armson.

4 A. Yes. The page that I am -- in terms
5 of the document, this is Document No. 10 in the
6 evidence package and it is identified on page 27.

7 Q. All right. You will find that at
8 page 85 of the witness statement.

9 A. If we look back historically, what we
10 find is that the entry into Ontario's forests, if I can
11 put it that way, has been one that's related very much
12 to social and cultural factors; it has been related to
13 economic factors, it has been related to the need to
14 develop or the decision to develop an infrastructure
15 via settlement in certain areas.

16 And with that we see an association, and
17 I mentioned this at the beginning, with access, first
18 of water and then more on land, by rail or by road, and
19 I think that if we can see these developments as they
20 have related to those particular elements, and as we
21 look at them in relation to not only the areas of the
22 undertaking, because I think if we have to come to the
23 area of the undertaking, we have to come in fact
24 historically from the south.

25 These maps that comprise a series of

1 documents are taken out of a book called The History of
2 Ontario in Maps, and it is a compilation of some of the
3 more significant maps that really portray the history.

4 And this first one is one that - I will
5 get my glasses on here - that deals with, it is a map
6 of Governor Simcoe's travels in 1795. Now, the point
7 of interest here is that the Saint Lawrence, the
8 waterways, the north shore of Lake Ontario, the
9 waterway system in southwestern Ontario, again, are the
10 important areas. They are the arteries of movement.

11 The only areas that are shown in here of
12 any settlement are in eastern Ontario and small
13 areas -- here you will notice the treck to Lake Simcoe
14 and back. So what we are dealing with at essentially
15 the turn of the 18th Century coming into the 19th
16 Century, is an area that is essentially shown in white.
17 There has, of course, been trapping and so on before,
18 but what we are dealing with, in terms of an
19 infrastructure, is a very limited infrastructure here
20 and this is at the turn of the century.

21 I also should mention that in addition to
22 the social and the economic factors, access, we are
23 also looking very much here as we move, particularly
24 into this century, we are looking at the impacts of
25 technology both, as I mentioned earlier, the technology

1 related to the utilization of the forest, the
2 technology related to society generally, and the
3 technology that relates to the management of the
4 resource itself.

5 The second document brings us into the
6 19th Century and is, in fact, a map of 1800 showing the
7 early settlements, again, with the large area, Lake
8 Nipissing here, large area here shown in white, but you
9 can see that we are beginning to get a lot more -- in
10 this map, a lot more identification of settlements.
11 This is the turn of the century into the 1800s.

12 Q. This is Document 11 at page 86.

13 A. What we again see here is not only
14 that infrastructure but back from the lakes we're
15 beginning to get roads. They are not too visible here,
16 but certainly in this area here, we are beginning to
17 get the trails and the passes and the horse -- I guess
18 some degree of coach trails and so on that are enabling
19 people to move from one end to the other without going
20 by boat.

21 We do not have, at this stage, any
22 forestry industry as such apart from a very local one
23 that might be for sawing some logs into boards, but
24 even then they are very primitive. In fact, in the
25 settlement, in the land clearing, the clearing took

1 place primarily by burning the forest and this, of
2 course, was a procedure that was used by the Huron
3 Indians earlier in the period of corn culture, but this
4 particular -- so that there wasn't a use of the forest
5 except by and large for local purposes.

6 And I think I noted that one of the first
7 cash crops from the forest here was pot ash, which was
8 exported to Europe by boat - it is kind of
9 interesting - in the upper New York State and in the
10 lower part of what is now Ontario. This was probably
11 the first major source of cash income for the early
12 settlers.

13 Q. Where did the pot ash come from?

14 A. From the ashes of the trees. It was
15 leached and that is what was sold for the lye and they
16 also made soap, useful for making soap locally, but it
17 became a commercial -- it was a commodity.

18 What was happening in Europe, however,
19 was - a bit about the same time, was going to have a
20 profound effect because the blockade by Napoleon of the
21 Baltic timber supply for Great Britain meant that she
22 had to look elsewhere and she couldn't look to the
23 United States, that source was gone, and so she looked
24 to Canada; and, in particular, she looked to the area
25 of Ottawa.

1 And I think it would be almost fair in
2 saying that the Napoleonic Wars and the need by Britain
3 for pine to replace that which they couldn't get from
4 the Baltic, was in fact the single important event that
5 started the timber industry in this province.

6 The utilization of that pine moved up the
7 Ottawa and, again, moved up the Ottawa because that was
8 the way they could travel and more importantly, that
9 was the only way watered by which they could bring the
10 logs down and move them out, and you have seen
11 historically in the books the rafts of timber going out
12 and so on.

13 So that the water access boats were
14 moving in to get at the wood, and also for moving the
15 wood out became the key factor in the period of the
16 19th Century and, as I say, the peak of that industry
17 came at the turn of the 19th into the 20th Century, but
18 by that time we had got into another marketplace.

19 I would just like to mention to the Board
20 that these were cuttings of pine, white and red pine
21 from Crown lands and initially, if you like, the
22 cutting of that was done by people without any -- with
23 very little regard for the fact that these were Crown
24 timbers and, in a sense, public property and it wasn't
25 very long before the Crown realized that they would

1 have to get themselves organized and they wanted to get
2 payment for this material.

3 That took a little while, and in 1849,
4 well prior to Confederation, a piece of legislation was
5 passed which, in fact, set in place the conditions for
6 the sale of Crown timber and those conditions in that
7 Act which relate to the payment of stumpage and a
8 formal process for the allocation of licences, the
9 setting in place shortly after 1849. In 1849 they had
10 stumpage prices and they had often a period of time
11 that the licensee could hold that area and they found
12 that some licensees were holding very large areas,
13 partly on speculation; so some two years later, in
14 1851, they also introduced an area charge so that that
15 was to be a disincentive to a licensee holding
16 exceptionally large areas.

17 So the two elements of revenue to the
18 Crown of stumpage; that is, payment by volume -- for a
19 given volume of timber that was cut, and the payment of
20 an area charge for the area over to which the licence
21 applied. Those two elements of revenue are still
22 essentially the same elements that we have to this day
23 and they were put in for those reasons.

24 The management, so-called, of the timber -
25 and this was the word that was used in the British

1 North America Act in 1867 - it is quoted here:

2 "The management and sale of the public
3 lands belonging to the province and that
4 the timber and wood thereon..."

5 Perhaps is one of the origins or
6 misunderstandings about management of either forest or
7 timber."

8 Because the word management there did not
9 really describe management in the sense of timber
10 management as we would define it or describe it today.

11 And I think this is a central point that
12 I will be returning to when we move historically
13 through this process, is that the word management,
14 which in the sense of timber management involves, and
15 in the sense forestry as a professional practice
16 involves all elements from the harvesting, in fact,
17 normally starts with the harvesting, and integrates
18 with all the subsequent activities of regeneration and
19 maintenance.

20 But there is a general misunderstanding
21 somehow because the word management was applied
22 historically in the past that management was taking
23 place; and, in fact, nothing could be farther from the
24 truth.

25 MR. MARTEL: Management meant cutting

1 primarily at that stage of the game?

2 THE WITNESS: Yes, management here meant
3 the cutting or logging of timber.

4 During the 19th Century, the harvesting
5 or logging of the pine was influenced by basically two
6 key factors, and one I have already mentioned, and that
7 was the access both in and also the use of water as a
8 means of transporting the wood; and the second was that
9 by the very nature of the way in which the country was
10 developing, as lands were cleared by logging, the
11 normal pattern was for agricultural settlement to take
12 place.

13 Now, there is a number of contributing
14 factors here. The logging of the day was seasonal, the
15 movement of the wood, once the tree was felled, was
16 done either with oxen or more particularly with horses,
17 and if you have horses they have to have oats, and if
18 you have oats you have to have farmland to grow the
19 oats on and you don't grow that at some distance.

20 So, in fact, the agricultural development
21 that moved in was associated really with what we might
22 talk about as the whole system by which the wood was
23 being extracted.

24 The second point that was related to
25 this, very intimately, was the native people. And so

1 the pattern of employment in the logging operations in
2 the wintertime, seasonal, and then the summer farming
3 became, in fact, a very integral part of the
4 development of our white pine logging history.

5 I, again, bring that up because the
6 seasonality and the juxtapositioning of agriculture at
7 that time with logging was something that became in
8 fact almost a socio-cultural factor and it certainly
9 was an economic one to the people of the day; it had a
10 very close tie, but it also meant some other things
11 were happening.

12 Often in the -- well, for example, as
13 areas were logged, the settlers would move in, there
14 would be slash, so they would burn it, and one of the
15 aspects of this period was that as the loggers were
16 moving on they found that their areas were - not only
17 the areas that were cut were being burned - but, of
18 course, once the fires got to any size they started to
19 spread and often what would happen is that they would
20 spread into the existing mature timber.

21 So you had set up a situation in which
22 there was a great deal of concern and, historically
23 this shows in the literature, by the loggers themselves
24 for the fact - and this is kind of interesting - that
25 they wouldn't be able to return -- they would lose

1 standing timber, but often the areas that were being
2 burnt, that the log -- any regeneration that existed
3 there was gone because they were being burned and
4 cleared for agriculture and, therefore, they were in
5 fact losing white pine land.

6 And I think that sometimes we read about
7 the loggers who went through and took out the wood and
8 didn't care less and there were those, but also there
9 was a great deal of concern and, in fact, the first
10 Royal Commission to deal with these set of issues, the
11 Rathbun Commission in this province, it had two prime
12 concerns: The one was regeneration of the pine forest;
13 and the second was the prevention or minimizing the
14 occurrence of fire. And when the commission started
15 out, its major concern - and Mr. Rathbun was a
16 lumberman - its major concern was regeneration and very
17 quickly it came to the conclusion that although
18 regeneration was a problem, the more immediate one was
19 in fact to bring about a set of mechanisms to minimize
20 fire and bring into play fire protection.

21 And I mention this because, again, you
22 have a certain set of contentious issues arising here
23 between those parties who were basically involved in
24 the forest and those elements of the forest that are
25 important.

1 The map which you see here, taking this
2 back to 1873, because it shows in detail some of the
3 settlement patterns and roads and this is in 1873.

4 MR. FREIDIN: Q. That is the document
5 that follows page 87?

6 A. Right. And there is some colouring
7 in here that shows, I believe, some of the major
8 licensed areas and it -- what it does, as I say, this
9 is Georgian Bay, you can see Lake Nipissing and the
10 Ottawa Valley, and you can see that by this time there
11 is a fairly hefty development in terms of
12 infrastructure of that area.

13 Again, we are talking about the area
14 essentially south of the area of the undertaking. The
15 area of the undertaking would be somewhere like through
16 about in here. (indicating)

17 Q. What do you mean when you refer to
18 infrastructure, you said in the sense of the
19 infrastructure?

20 A. The infrastructure would be a number
21 of things. First of all, it would be the laying out of
22 and identification of settlement, townships and so on.
23 That means that you are in effect becoming organized.
24 The towns and villages, and more particularly the
25 transportation routes, the roads and so on has - and by

1 this time we are also having some railways in place.

2 This, however, is an area predominantly
3 now of agriculture rather than of forest. In fact, the
4 forested area generally -- and I can't give you the --
5 generally the forested area in the late 19th Century in
6 southern Ontario was much, much smaller than it
7 currently is in many of the areas as you will see later
8 on were denuded of forest, farmed out for wheat and
9 then when the expansion to the west went on, the wheat
10 farming just fell apart.

11 THE CHAIRMAN: Mr. Armson, is there
12 something in Canada equivalent to the Canadian Geologic
13 Survey with respect to the forestry areas of the
14 country or the province?

15 THE WITNESS: The Canadian Forestry
16 Service, if you like, pulls together information on the
17 forest inventory in somewhat of an analagous manner.
18 You might say the geological survey of Canada, but it
19 itself doesn't carry out the surveys whereas the
20 geological survey does.

21 And, of course, because each of the
22 provinces within its jurisdiction does its surveys and
23 inventories in a somewhat different manner, the
24 Canadian Forestry Service has to have some kind of a -
25 I won't say a lowest common denomitor - but a way in

1 which bringing that together.

2 And the report that is a document in this
3 one, Mr. Bonner's report, is the most recent. I think
4 it is worthwhile also pointing out that the federal
5 Canadian people and the provinces have a standing
6 committee on inventory which has been long-standing,
7 but it is a very active committee and has worked
8 towards bringing more or less consistent measures and
9 consistent units to be used, but that is, I think, the
10 closest I could come in the analogy.

11 MR. FREIDIN: Q. When you refer to the
12 Bonner document, is that the Document No. 2?

13 A. That is, I believe, Document No. 2,
14 yes, the one of 1981 on page 43 in the -- it has the
15 frontest piece of the document on page 44 which shows
16 the aggregated areas by province. The map, and I
17 apologize, this slide is perhaps not as clear. This
18 was a map prepared in 1905.

19 Q. And it is Document No. 13 at page 8.

20 A. And it shows the Province of Ontario
21 and, again, at the turn of the century, and perhaps one
22 reason for showing this is that 1906 was the peak of
23 production of white and red pine from the Province of
24 Ontario.

25 And the revenues from that production

1 was, in fact, a main source of income to the province;
2 in fact, it was the major source of income for some
3 period of years at that turn of the century and was, of
4 course, as a main source of income to the province, was
5 used by the province primarily in the need for
6 provincial services in southern Ontario.

7 This is a map, a little bit earlier, and
8 I put it in merely to show that even at this early
9 date - and this is basically back into the 19th
10 Century - but it was an example of mapping of
11 timberlands.

12 You will notice that this is the Ottawa
13 River and we have Carleton County, Frontenac County,
14 Hastings and so on, so this is the area - I am taking
15 you back a little bit - but it seemed to be a useful
16 map to portray the fact that these areas -- this is the
17 infrastructure. You will notice over here a licence
18 here to an E.B. Eddy on the central part of that. So
19 these are the timberlands and the licensed areas at
20 that time.

21 Q. What is the date of that?

22 A. This is 1873, this particular map, it
23 should be anyway. 1875 -- I am sorry, my apology,
24 1875.

25 Q. It is Document 14 at page 82.

1 A. Now, I mentioned a few moments ago
2 the fact that the harvesting here, the need for
3 regeneration, and the matter of fires resulted in a
4 Royal Commission 1897, of the Rathbun Commission.

5 And also at this time there was a
6 considerable concern at the turn -- in fact, the 1880s
7 and the 1890s were a period of extreme concern and
8 discussion about the need for forestry, for proper
9 management of forest lands, and the conservation of --
10 in the sense of wise use.

11 1882 was the North American Forestry
12 Conference which was held in both Cleveland and in
13 Montreal. At the time the concern was being expressed
14 by politicians, by lumbermen, and by senior civil
15 servants, and in this period, from 1875 pretty well
16 through to 1900 - probably if you look back you will
17 see many, many newspaper accounts concerned about the
18 state of the forest - and I mentioned, put that into
19 context because they were concerned about a forest that
20 was the white pine forest, that was the white pine
21 forest in southern Ontario and just immediately north
22 of it. There was no concern obviously expressed about
23 anything beyond, in fact, the area of North Bay, in
24 effect.

25 So that was the -- in other words, the

1 forest was infinite, all they were concerned about was
2 that kind of forest because that was the only forest
3 they really had any appreciation for.

4 This is in the late 19th Century and,
5 again, it emphasizes -- these black lines on the map
6 are railway lines, and you will note that the railway
7 lines running through the southern -- from one end of
8 the province to the other, across from east to west in
9 the south, part up to the Georgian Bay, many areas into
10 Lake Huron, but there is an area in here -- the area
11 essentially of Algonquin Park and the Algonquin region
12 which has one slim line through it and the one up the
13 valley.

14 But that is an area that at that time,
15 apart from some logging, really hadn't got the
16 infrastructure for further access, largely because of
17 the topography I believe and the nature of the soil.
18 The settlement tended to be centred around that.

19 Some of the early development roads up
20 through Parry Sound and Muskoka are indicated here and
21 there was a railway line, as you know, it came later
22 but built by lumbermen that took right through the park
23 and went across to Depot Harbor in Georgian bay.

24 Q. You said there was a railway
25 going across there?

1 A. There was a railway line that was
2 built, this is after 1888, it was built by J.R. Booth
3 and it was the Canada-Atlantic Railway and it connected
4 from his licences here through the park and came out
5 through to just south of Parry Sound to a location of
6 Depot Harbor, and in fact for a period of years that
7 was the -- during the frost-free season, that was the
8 fastest shipping route from Chicago to Liverpool; by
9 boat from Chicago to Depot Harbour, by rail through to
10 Halifax, and then out the other side.

11 That was, as I say, a railway put in
12 there by a lumberman initially for logging purposes
13 although he had his eye I think for other chance too.

14 But, again, the railways meant that there
15 was a different way of transporting the product.
16 Instead of water we now had a way -- initially a way of
17 transporting other products, though it wasn't very --
18 it wasn't used of course really for large pine logs,
19 but it brought with it the opportunity for shipping
20 products in a different way.

21 Q. Did the trains have bells like the
22 one going by?

23 A. It's funny how there seems to be some
24 kind of an association with the timing here, I don't
25 know.

1 THE CHAIRMAN: That is J.R. Booth's old
2 railway train.

3 THE WITNESS: I haven't heard it
4 whistling in the same melancholy way as a steam engine.

5 I mentioned earlier the intensity of
6 development here. During the turn of the century, with
7 the opening up of the west, the wheatlands of the west
8 providing wheat, and much of the area in southern
9 Ontario that had originally supported pine forest had
10 been cleared, and these were often light sandy lands,
11 the areas - to just identify them - such as in the area
12 north of Toronto, in the interlobation range, Aurora
13 situated at one end of it, that area running east and
14 west, another area south of -- in Simcoe County.

15 These were light, they were easy to
16 cultivate, they were easy to clear, and they were
17 easily farmed out, and they became blow sand or
18 wastelands.

19 So while there was still logging going on
20 in the white pine forest of what we call central
21 Ontario, there was in the agricultural side a
22 particular concern about the development of these
23 wastelands. Buggies would become entrapped in them -
24 this is in Simcoe County, actually not too far from, I
25 believe, the present Borden station, and not only were

1 the areas "wasteland" but they were areas that society
2 of the day believed, or a number of people believed
3 should be reforested because they had, in fact, carried
4 a forest before they had been farmed out.

5 And so while there was a concern about
6 fire protection in the forest to the north of this
7 area, there was in southern Ontario at the turn of the
8 century a great deal of concern about how do we
9 stabilize these areas.

10 And the result was that the province
11 initiated a program for reforestation within these
12 areas which was given a tremendous impetus, initially
13 in 1980 with the putting in place of the first nursery
14 in the province owned by the provincial government.

15 A nursery just prior to this, a few years
16 in fact, four years prior to this, had been established
17 at the University of Guelph and a Mr. E.J. Zavitz, who
18 is identified in this plaque, had been in charge of
19 that, and the province was so concerned and this was --
20 southern Ontario, this was related, I would emphasize,
21 to the rehabilitation of agricultural wastelands, and
22 so they set in place this station.

23 And then later on, in 1921, the first
24 legislation dealing with the reforestation and
25 providing for municipalities to enter into the purchase

1 of wastelands which would then be reforested and
2 managed by the province, and this was a key development
3 because it was the first time in the province that we
4 had actually operationally a setting in place of a
5 program to produce seedling, to gather seed, produce
6 seedlings and, in fact, carry on an out planting in an
7 operational and utilizing professional and technical
8 expertise.

9 THE CHAIRMAN: Is this the forerunner of
10 conservation authorities in the province?

11 THE WITNESS: I think many people would
12 say that the agreement forests, the municipal agreement
13 forests, were, to a large degree, the forerunner, yes,
14 Mr. Chairman.

15 MR. FREIDIN: Q. And where did this
16 regeneration - this nursery that was created in 1908,
17 where did they attempt or where did they plant the
18 trees that were grown there?

19 A. Well, the trees were planted mainly
20 in southern Ontario on these wastelands that were
21 purchased often for a few cents an acre by the county
22 or the municipality, and then the province provided the
23 trees and undertook the planting and also the
24 management.

25 St. Williams is in Norfolk County and

1 just a short distance north of the shore of Lake Erie,
2 there followed in succession after World War I a series
3 of nurseries, Midhurst Nursery just outside of Barrie,
4 the Orono Nursery which is a little east of Oshawa, and
5 a little north of Newcastle on Highway 35-115, and the
6 Kemptville Nursery came in considerably later.

7 But the Orono, the Midhurst and the St.
8 Williams nurseries were the four major nurseries. They
9 provided stock for essentially those areas. Simcoe
10 County forests is one of the largest agreement forests
11 that we have.

12 Q. Was there any particular species that
13 were the subject matter of the nursery attention?

14 A. Yes, red pine was the dominant
15 species. There were other species grown, some
16 hardwoods, but primarily red pine and white pine.

17 At the same time that this was going on,
18 and I would draw your attention to the date 1908,
19 because of the ferment, discussion and concern about
20 forestry and forest conservation - is often the term
21 that was used in those days - it was recognized that no
22 real steps could be taken unless there was suitable,
23 professional and technical skills and knowledge
24 available.

25 So in 1907, just one year before this

1 station was set up, the first University School of
2 Forestry was established at Toronto, and the individual
3 who was invited in and became the first dean was a Dr.
4 Furno, who was originally a Prussian-trained forester
5 and, in fact, had been one of the first heads of the
6 Forest Service in the United States, had then become
7 the Dean of the Forestry School at Cornell University
8 and then moved subsequently to Ontario.

9 And that really was a signal point
10 because, as I indicated in the concept, if you don't
11 have that body of professional expertise, you really
12 haven't got another part of the system that can lead
13 you through to management in the fullest sense of the
14 word.

15 The period of World War I created
16 somewhat of a hiatus.

17 Q. Which document?

18 A. This is document...

19 Q. 18?

20 A. 18.

21 Q. At page 94.

22 A. Right: One of the -- I mentioned the
23 importance of marketplace and technology. Obviously,
24 the white pine industry didn't go on for ever, its at
25 its level, it peaked in the early part of this century

1 and, in fact, the marketplace, once the Britain went
2 back to her access of timber in the Baltic, then the
3 white pine flowed down the Ottawa and down into the
4 eastern seaboard in the United States, that was the
5 area.

6 The white pine lumber industry moved
7 across here and, of course, into the Lake of the Woods
8 region at a later date and supplied the U.S. market
9 there. But the turning point in World War I was, first
10 of all, the technology related to pulp and paper
11 production and the presence of a major marketplace for
12 newsprint in particular in the United States.

13 The technology was, first of all, a major
14 technology requiring the large capital investment as
15 contrasted with the investment for a saw milling
16 industry at that time. There were large saw mills and
17 they were extensive, but nothing could be compared to a
18 newsprint mill, pulp mill producing newsprint.

19 Secondly, the fiber, the raw material to
20 provide the newsprint in the context of the technology
21 of the day, was spruce and the spruce forests were
22 here. (indicating)

23 Q. You are indicating...

24 A. This is in the -- we are talking
25 about the area, the major area of the undertaking,

1 particularly the boreal forest region across the top.

2 Yes, Mr. Martel?

3 MR. MARTEL: Can I ask a question. You
4 seemed to jump a period. Mining was using in the
5 smelting process, at about the 1920, was that not a key
6 supply of fuel for the mining industry; was the white
7 pine through the Sudbury region and beyond?

8 THE WITNESS: There was pine used, yes,
9 Mr. Martel, and it was key to the industry and locally
10 it would be of significance.

11 But in terms of a product on a large
12 scale, which would be exported, no, it wouldn't be
13 of -- locally it would be of a large quantity, but not
14 provincially in that sense. The white pine that was
15 exported was, in fact, I think far greater in amount.
16 I can't swear to that, but I believe that would be
17 true.

18 In the Sudbury area, certainly there was
19 a large amount of timber used in the mining and
20 certainly in the gold mines in northern Ontario. Much
21 of the saw milling industry in the Timmins area was
22 related to the gold mining industry -- to the mining
23 industry there. That would be locally, the jack pine
24 in that case.

25 But the -- I would just hasten to add

1 that the export for out of the province --

2 MR. MARTEL: I am just talking volume
3 terms, I am not concerned -- you indicated that the
4 market - and I am not being argumentative--

5 THE WITNESS: No, no, no, I understand
6 that.

7 MR. MARTEL: --I am just trying to fill
8 in my own mind that, in fact, what brought much of the
9 white pine to an end in its usage was the fact that so
10 much of it was used in the mining industry for
11 smelting.

12 THE WITNESS: Well, I can't speak to how
13 much was used directly there, that I can't answer that.
14 I do know that locally it was a very important
15 component, but the documents that I am aware of don't
16 illustrate that in any clear way.

17 Certainly, local use would be of
18 significance. But overall, in terms of the province, I
19 think what we are looking at here, following World War
20 I, is the initial development of the pulp and paper
21 industry, essentially in the boreal forest, although
22 there may be local mining use for certain timbers,
23 required a large amount of capital, it utilized a
24 totally different technology, it was concerned with a
25 species that up to that time was not being used by any

1 one else in an area in which there was essentially no
2 real conflict of use in terms of the product, and it
3 also required a large amount of energy to maintain that
4 productive system.

5 And, with that, it required an
6 infrastructure of a quite different level of magnitude
7 than would be associated with a saw milling community.

8 And so in terms of those key elements and
9 the provincial sense that there was a need to develop
10 an infrastructure in the north, as there had been in
11 the south there were -- in the areas of Iroquois Falls,
12 actually even during World War I, Dryden, there were
13 pulp mills set in place and, of course, one of the
14 conditions was to ensure a continuing supply of timber.
15 And, in those days, the simplest way to identify that
16 was to draw a line on a map, a very large area,
17 without -- because at that time there was no real
18 knowledge of the extent of the forest, there was no
19 inventory of that kind.

20 It also meant that there were two factors
21 coming into play here, the access to in fact obtain the
22 raw material supply, the spruce, was by water, it was
23 still a seasonal activity. If you like, the logging,
24 the traditional logging methods of cutting, felling and
25 moving with a horse or by manpower, were still the ones

1 that were in use.

2 The water supply also gave the mill the
3 river system and that is why they are located on all
4 the rivers, along major river systems. It also meant
5 that there had to develop around that mill two -- there
6 were two, really two kinds of, not people, but two
7 kinds of work that was developed.

8 There was the work that was going on in
9 the mill which brought into this area essentially
10 relatively skilled labour, even in the pulp mills of
11 the day and on a large scale, and the companies that
12 were involved in this development had to in fact build
13 town sites, Kapuskasing, Iroquois falls, these are
14 classic examples of large town sites built by the
15 company, obviously with the approval and conditions of
16 the province, but that meant a relatively large
17 infrastructure.

18 The movement of the raw material was
19 still by water, but the products could now come out by
20 rail, and that was the key difference. The newsprint
21 could come down from northern Ontario by rail on a
22 continuing basis, even if the wood supply was a
23 seasonal one.

24 Q. This particular reference to rail
25 being required is found on page 32 -- pardon me,

1 paragraph 32 of the witness statement, and you say in
2 that paragraph:

3 "To transport these forest products
4 required rail transport."

5 Just explain to me why rail transport was
6 required?

7 A. Well, there was no other way of
8 getting the material out essentially because the
9 water -- the rivers were all, for the most part,
10 flowing in the wrong direction, certainly Kapuskasing
11 and Iroquois Falls, and I don't know if there was any
12 real sea-going -- cargos moving out of James Bay at
13 that time.

14 It was the only way to move it right into
15 the United States very readily. This is essentially in
16 a packaged form, in rolls of newsprint that they can
17 utilize.

18 There is an interesting point, and I am
19 sorry it isn't mentioned here, but following World War
20 I, one of the first local surveys of the forests in
21 this province that was ever conducted was of the James
22 Bay watershed because at the time the province was
23 concerned about having an access to salt water other
24 than down the Saint Lawrence.

25 In World War I there were German

1 submarines operating in the Gulf of the Saint Lawrence.
2 At that time, Ontario felt that there was an
3 alternative route through the James Bay/Hudson Bay and
4 out that way. And that was one of the reasons why,
5 actually in the very early 1920s the first surveys that
6 were undertaken up there, basically forest surveys to
7 see what could be done in terms of access to salt
8 water.

9 THE CHAIRMAN: Mr. Freidin, would you
10 mind talking in the microphone so the reporter can hear
11 you.

12 MR. FREIDIN: Q. Mr. Armson, before you
13 continue, can I just take you back to 1907, paragraph
14 29 of your witness statement.

15 There is a reference in paragraph 29 that
16 although harvesting and regeneration were areas of
17 study at the University of Toronto, that they were not,
18 at that early stage of the profession, practised in an
19 integrated fashion. Could you explain to me what you
20 mean by that?

21 A. Yes. With the setting in place of
22 the forestry school, the first graduates - and there
23 were very few, obviously, immediately into World War
24 I - but following World War I, the first graduates with
25 the development of the pulp and paper industry in parts

1 of northern Ontario, the first grad -- and also the
2 reforestation development down here in southern
3 Ontario.

4 If you look at the first graduates that
5 came out either went with the industry and were
6 concerned, therefore, with logging, and many of the
7 engineering or quasi-engineering aspects relating to
8 the logging and the movement of wood, or they worked
9 for the province, either in southern Ontario, and there
10 was a small number that were involved in the surveys
11 that I originally had mentioned in northern Ontario.

12 In fact, in the 1920s, there were a
13 relatively large number of graduates that came out
14 following World War I, people who had been in the army
15 and services, and a number of them would have been in
16 the air corps at that time, and this was a factor that,
17 in fact, led to the use of airplanes in surveys in both
18 Ontario and Quebec but, particularly, in Ontario.

19 This was probably one of the major areas that developed
20 that technology way ahead of most other jurisdictions.

21 So those three areas became key areas but
22 they weren't linked. There was no logging really of
23 any substance going on in southern Ontario, but there
24 was regeneration and reforestation of agricultural
25 wastelands.

1 There were surveys going on up here and
2 there were people administering the sale of Crown
3 timber and there were people in industry who were
4 concerned primarily with logging. Although they came
5 out of the same educational process, and they all had
6 had courses in various aspects of these, in their
7 employment they were basically focusing on one or two
8 at the most facets of that practice of forestry. And
9 this, again, is a key factor.

10 Q. Are you aware as to whether in fact
11 the topics of harvesting and regeneration were taught
12 as an integrated set of activities?

13 A. Yes, they were. In fact, the
14 curriculum of the school - and rather an interesting
15 one to go back to - had many elements that we would now
16 think were perhaps almost an ideal curriculum because
17 the school was -- the first dean was an European
18 forester.

19 The principles in the practice of
20 forestry, harvesting is an integral part of forestry
21 and of timber management and that when you make your
22 decisions in terms of planning harvesting, you also are
23 making your decisions about the type of regeneration
24 because the harvesting, so-called silvicultural
25 harvesting systems are, in fact, embodied within the

1 principles and the plans and the actions for
2 regeneration.

3 The teaching was there, but in actual
4 practice outside, it was somewhat fragmented.

5 Q. Again, those silvicultural systems
6 will be described by the panel dealing with harvests.

7 A. Whoops. Maybe we can go back here.

8 Q. I think when I interrupted--

9 A. Yes, you did, my flow.

10 Q. --your flow that you were somewhere
11 around paragraph 32.

12 A. In this period of the 1920s, there
13 was a considerable amount of activity although it was
14 fragmented. There was professional expertise that
15 centered, in terms of regeneration, primarily in
16 southern Ontario, to a very limited extent in central
17 Ontario.

18 But the concerns were there for forest
19 management and the concerns were for forest management
20 in its totality in northern Ontario, particularly with
21 respect to the pulp and paper companies who had
22 developed there.

23 And, again, the literature shows this
24 very vital kind of discussion that was going on with a
25 small professional body who -- most of them knew each

1 other, they knew what their education was and they were
2 concerned about developing.

3 The result of this was that in 1929 the
4 government of the day passed legislation which assigned
5 responsibility for both the carrying out of inventory,
6 forest inventory, and management of the timber on the
7 licensed area to the pulp and paper companies, and this
8 legislation was called the Pulpwood Conservation Act,
9 and it is a very interesting one because it was the
10 first legislation in which the term "sustained yield"
11 was introduced. I don't believe -- if I recall, it
12 wasn't defined, but it was introduced.

13 The year in which that legislation was
14 passed was not an auspicious one in terms of the
15 industry certainly in subsequent years. And, in
16 effect, the implementation of the intent of that
17 legislation never took place.

18 There had been carried out during this
19 period a very broad inventory of much of the forests of
20 Ontario, very broad, by two professional foresters, one
21 of whom is still alive, Mr. Sharpe, and the late Mr.
22 Sharpe and Mr. Brodie, and their report in 1930 was the
23 first comprehensive attempt at a quantifiable survey or
24 inventory for the forests of Ontario, but it was based
25 on very limited sampling, but it is an interesting

1 document in that it was the first comprehensive survey.

2 During the 1930s, they were essentially
3 forestry languished because in terms of the industry it
4 was struggling to stay alive; one company, the Abitibi
5 paper company went into receivership during that time.
6 There were -- in fact, during that period the
7 provincial government stepped in and set quotas for the
8 companies. They were afraid of companies in fact going
9 bankrupt totally, and what they did is they said: All
10 right, if there is so much newsprint to be
11 manufactured, there will be quotas set and they were
12 parcelled out to the various companies, to keep not
13 only the company alive, but also the communities which
14 were so dependent on those companies in northern
15 Ontario.

16 THE CHAIRMAN: Mr. Freidin, I think we
17 are going to try and wrap this up for today at around
18 five, so whenever it is a convenient time for Mr.
19 Armson to stop today we--

20 MR. FREIDIN: Perhaps I will leave that
21 up to Mr. Armson because, as you can see, this part he
22 is sort of carrying it on his own.

23 THE WITNESS: Well, I would think, Mr.
24 Chairman, that perhaps this is a convenient time.

25 I am really sort of coming through the

1 Depression and coming up to World War II, so that would
2 be a convenient historical event in which to pause
3 until tomorrow.

4 THE CHAIRMAN: Very well.

5 Thank you, ladies and gentlemen. The
6 Board will adjourn until 9:30 tomorrow morning.

7 Thank you.

8 ---Whereupon the hearing adjourned at 4:55 p.m., to
9 reconvene Wednesday, June the 8th, 1988, commencing
 at 9:30 a.m.

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